# Περιφέρεια | Regional Integration: Politics, Economics, Governance

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Περιφέρεια | Regional Integration: Politics, Economics, Governance: Addressing Climate Change in Turbulent Times

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# ΠΕΡΙΦΕΡΕΙΑ
# REGIONAL INTEGRATION

politics economics governance



Επιστημονική επιθεώρηση για την περιφερειακή ολοκλήρωση-πολιτική, οικονομία & διακυβέρνηση

Η Επιστημονική Επιθεώρηση Regional Integration: Politics, Economics and Governance (Περιφέρεια) εκδίδεται στο πλαίσιο λειτουργίας του Μεταπτυχιακού Προγράμματος Σπουδών: «Διεθνής και Ευρωπαϊκή Διακυβέρνηση και Πολιτική» του Τμήματος Πολιτικής Επιστήμης και Δημόσιας Διοίκησης (ΠΕΔΔ) του Εθνικού και Καποδιστριακού Πανεπιστημίου Αθηνών (ΕΚΠΑ).
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# REGIONAL INTEGRATION

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The scientific journal *Regional Integration: Politics, Economics & Governance (Περιφέρεια)* aspires to establish itself as a forum for scientific research on issues related to regional integration at the international level. The term regional integration signifies both the institutionalized cooperation between states aiming at gradual economic integration and/or convergence in different policy fields (regionalism), as is the case for example, with the European Union (EU), the Association of Southeast Asian Nations (ASEAN) or the Southern Common Market (MERCOSUR), as well as spontaneous, «bottom-up», mainly economic, cooperation between state and non-state actors from the same region (reginalization).

In this context, the journal hosts scientific articles exploring the economic, political, and institutional aspects of current regional integrations, as well as their relations with the rest of the world, including other regional integration initiatives (inter-regionalism). The journal also hosts scientific studies that examine the dynamics and characteristics of -mainly but not exclusively- economic integration as marked by enhanced economic relations and transactions of all kinds (commercial, financial, monetary, investment) among economic agents in various regions of the world. Finally, the journal hosts articles exploring the interaction of globalization trends and processes with those of regional integration. The journal publishes articles relating to all these themes that are both of theoretical and empirical orientation.

The journal publishes original research articles, brief research notes, policy papers as well as book reviews. It uses the «double blind review» process, thus ensuring the transparency and impartiality of reviews. The journal has adopted a Platinum Open-Access Policy allowing immediate access to its content without the requirement of a paid subscription, fee or license. Authors are not charged with fees for submitting, editing and publishing their texts.

Η επιστημονική επιθεώρηση *Regional Integration: Politics, Economics & Governance (Περιφέρεια)*, φιλοδοξεί να καθιερωθεί ως ένας χώρος παρουσίασης επιστημονικής έρευνας σε θέματα που σχετίζονται με την περιφερειακή ολοκλήρωση σε διεθνές επίπεδο. Με τον όρο περιφερειακή ολοκλήρωση εννοείται τόσο η θεσμοθετημένη συνεργασία μεταξύ κρατών με στόχο τη σταδιακή οικονομική ολοκλήρωση ή/και σύγκλιση σε διαφορετικά πεδία πολιτικής (περιφερισμός/ regionalism), όπως συμβαίνει ενδεικτικά, με την Ευρωπαϊκή Ένωση (ΕΕ), τον Σύνδεσμο Χωρών Νοτιοανατολικής Ασίας (ASEAN) ή την Κοινή Αγορά του Νότου (MERCOSUR), όσο και η αυθόρμητη, «από τα κάτω» περιφερειακή ολοκλήρωση (regionalization), σε οικονομικό, κυρίως, επίπεδο, μεταξύ κρατών που ανήκουν στην ίδια περιοχή του πλανήτη.

Στο πλαίσιο αυτό η επιθεώρηση φιλοξενεί επιστημονικά άρθρα που εξερευνούν τις οικονομικές, πολιτικές και θεσμικές διαστάσεις των εν λειτουργία περιφερειακών ολοκληρώσεων διεθνώς, καθώς και των σχέσεων τους με τον υπόλοιπο κόσμο, συμπεριλαμβανομένων και άλλων περιφερειακών ολοκληρώσεων (inter-regionalism). Η επιθεώρηση φιλοξενεί επίσης επιστημονικές μελέτες που εξετάζουν τη δυναμική και τα χαρακτηριστικά της οικονομικής -κυρίως, αλλά όχι αποκλειστικά- ολοκλήρωσης μεταξύ οικονομικών δρώντων σε διαφορετικές περιοχές του πλανήτη, όπως αυτή καταγράφεται από ενισχυμένες οικονομικές σχέσεις και συναλλαγές κάθε είδους (εμπορικές, χρηματοπιστωτικές, νομισματικές, επενδυτικές). Τέλος, η επιθεώρηση φιλοξενεί άρθρα που εξερευνούν την αλληλεπίδραση των τάσεων και διαδικασιών της παγκοσμιοποίησης με εκείνες της περιφερειακής ολοκλήρωσης. Για τη διερεύνηση όλων των παραπάνω θεματικών, η επιθεώρηση δημοσιεύει άρθρα τόσο θεωρητικού όσο και εμπειρικού προσανατολισμού.

Η επιθεώρηση δημοσιεύει πρωτότυπα ερευνητικά άρθρα, πιο σύντομα ερευνητικά σημειώματα, κείμενα πολιτικής καθώς και βιβλιοκρισίες. Χρησιμοποιείται η διαδικασία της «διπλά τυφλής αξιολόγησης» (double blind review) για την κρίση των άρθρων, διασφαλίζοντας έτσι τη διαφάνεια και την αμεροληψία των κρίσεων. Η επιθεώρηση έχει υιοθετήσει την πολιτική **Platinum Open-Access Policy** θέτοντας το περιεχόμενο της σε ελεύθερη πρόσβαση για τους αναγνώστες χωρίς την υποχρέωση επί πληρωμή συνδρομής. Οι συγγραφείς δεν επιβαρύνονται με χρεώσεις υποβολής, επεξεργασίας και δημοσίευσης των κειμένων τους.

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## 1. Introduction

Over the last years, the term "climate crisis" has been increasingly used to emphatically describe the recurrence of extreme phenomena and the severe deterioration of climate, and to awaken society. Sudden and extreme weather events, which are now occurring more frequently and with greater intensity and duration, alongside droughts, heat waves, floods, and wildfires, cause massive destruction and impact water resources, agriculture, infrastructure, health, and security, accelerating population displacement and testing the resilience of governments and national economies.

However, a crisis is typically a temporary phenomenon that peaks and then subsides or transitions into something else. Thus, the term "climate crisis" is misleading because it does not include the parameter of duration. Moreover, it gives the impression that a return to normality is possible. But this is now unattainable. The Earth's average temperature has already risen significantly, and harmful greenhouse gas emissions are still increasing rapidly. We are therefore facing a phenomenon that is causing an emergency, a situation that requires urgent action in two directions: to drastically reduce the causes (climate mitigation) and to manage the consequences (climate adaptation). Climate change is a phenomenon that we will be constantly confronted with and which we must learn how to manage. There are practices that can help in this direction, but the pace of our mobilization is exceedingly slow.

Despite the heightened politicization of the green transition ahead of the European elections, the European Union, which ranks fourth on the list of global polluters, remained committed to achieving the European Green Deal goal of achieving climate neutrality by 2050. Having adopted most of the necessary legislation, attention now turns to implementation, which requires Member States' cooperation to achieve the collective European goal. Implementation is far from easy in a world of increasing polarization and competition. It will only succeed if the net-zero carbon emissions target is combined with Europe's economic transformation. Green policies are needed to establish a technological advantage that will help EU industries compete with other countries. Countries who transition now will also have opportunities to be industry leaders in green manufacturing which will also bring new jobs. However, solutions should not be limited to technical issues, they also need to have a social dimension. The EU and its member states need to look seriously at how they can protect the most vulnerable and give more attention to the just transition. They also need to enhance society's resilience, so it can deal with interconnected simultaneous crises in the years ahead. It is clear these changes cannot be achieved by the 'invisible hand' of the market. Stronger public institutions are needed, which are capable of discharging the state's responsibilities, serving the needs of the most vulnerable, providing the necessary safety nets, and cutting funding to activities which impede social well-being.

This special issue is about unpacking this fundamental conundrum. A group of scholars from different disciplines reflect on the main challenges in addressing climate change and achieving the goals of climate neutrality and just transition amid turbulent times. Why, despite clear scientific evidence and warnings climate policy actions needed to prevent further catastrophe are so limited and slow? Why has the economy failed to protect us from climate change? What is the role of courts and international tribunals in clarifying states' responsibilities in the global response to climate change? What are the main challenges for the European Union in addressing climate change? How can these challenges be addressed in a world of increasing geopolitical rivalry and economic fragmentation? How can Greece continue to pursue and achieve the goals of climate neutrality and just transition?

Costas Cartalis provides a brief overview of the European Union's climate ambition. He highlights key findings and recommendations from the European Scientific Advisory Board on Climate Change on the consistency of EU and national measures with the overarching climate neutrality objectives.

Andreas Papandreou delves into three fundamental and interlinked questions concerning economic analysis of climate change or climate economics: Why has the economy failed to protect us from climate change? What is the optimal level of climate change mitigation? What are the best means to achieve these goals? The author argues that the evolving debates and approaches economists have taken to answer these questions have profoundly shaped the broader discussion on the strength and strategies of climate action.

Marie-Claire Cordonnier Segger and Markus Gehring explore the role of courts and international tribunals in clarifying states' responsibilities in the global response to climate change. Three international courts, namely the International Tribunal for the Law of the Sea (ITLOS), the Inter-American Court for Human Rights (IACtHR) and the International Court of Justice (ICJ) have asked recently, through advisory opinions, to clarify the legal obligations of States in addressing climate change, including the prevention of ocean impacts, and the protection of human rights. The authors highlight the significance of climate advisory proceedings in these tribunals, briefly underlining the legal reasoning of the ITLOS advisory opinion, its implications for international climate governance, and the questions and arguments before the IACtHR and the ICJ. The article discusses the transformative potential of advisory opinions. The authors argue that in their responses to the pressing need for legal clarity, courts are offered an historic opportunity to shape the contributions of international law to global sustainability, justice and the survival of life on Earth.

Emmanuella Doussis presents the state-of-the art of the Greek climate mitigation policy, maps it in the context of the international and European legal and political framework and highlights the challenges ahead to achieve just transition and climate neutrality by 2050. She argues that in a world of increasing polarization and competition, the road to achieving these goals is not covered with roses. It will be smoother if it is combined with transformative and coordinated policies

as well as strong societal support. Relevant stakeholders need to be effectively engaged in this process not simply through formal consultation processes but through an open and constructive social dialogue that will enable them to co-design sustainable solutions.

Nikos Mantzaris criticizes the European Commission on its persistence to enforce the partial privatization of Greece's Public Power Corporation's lignite portfolio in the context of Greece's economic rescue programs, while contradicting even the EU's own climate policies. He further highlights the role of environmental NGOs and think tanks, which, together with key developments in the EU legislation prevented a structural lock-in to lignite and paved the way for the decision to phase out lignite by 2028.

George Dikaios explores the case of the European port governance, a sector governed mostly through intergovernmental agreements and not directly contributing to the fight against climate change. The author delves into the European Studies literature, and utilizes empirical data, along with European legislation, to showcase that port 'policy' has not been developed and that the penetration of climate policy might lead to a faster development of the former than expected.

Othon Kaminiaris examines the efficiency of climate adaptation policies. He presents and analyses the international framework for climate adaptation and that of the European Union. Then he explores the Greek framework and provides an extensive overview which sets the stage for the evaluation of its efficiency. The author explores Greece's performance and compliance with the international and European imperatives, underlying implementation gaps, including the incohesive division of competences, poor monitoring and compliance procedures.

Finally, Alexandros Sarris explores the rising tensions in the Arctic and the EU's interests, examining the role that the EU hopes to play through its environmental policy. In the aftermath of the war in Ukraine, the use of the Arctic doesn't seem to be associated only with peaceful uses since it has been an era of tensions and conflicts among the superpowers. The EU seems to be willing to get more actively involved in the region through its environmental policy even though European Arctic States have their own individual interests and policies in the Arctic Ocean.

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POLICY BRIEF
ΚΕΙΜΕΝΟ ΠΟΛΙΤΙΚΗΣ

# Towards climate neutrality in the European Union

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## Abstract

The European Union (EU) has significantly reduced its net greenhouse gas (GHG) emissions since 2005. However, the pace of reductions must accelerate substantially—more than doubling the average annual rate observed between 2005 and 2022—if the EU is to achieve its 2030 target of at least a 55% net reduction in GHG emissions compared to 1990 levels, and climate neutrality by 2050. Additional efforts are needed across all sectors, i.e. energy, transport, industry, buildings and others. In addition, attention is needed regarding the land use, land-use change, and forestry (LULUCF) sector, where the carbon sink has sharply declined since 2015. Achieving the 2030 target depends on the effective implementation of the Fit for 55 package, especially at the national level. This paper[1] provides a brief overview of the EU's climate ambition and presents key findings and recommendations of the European Scientific Advisory Board on Climate Change (hereinafter referred to as the Advisory Board) on the consistency of EU and national measures with the overarching climate neutrality objectives.

**Keywords:** European Climate Law, climate ambition, climate neutrality, greenhouse gas emissions, just transition

# Οδεύοντας προς την κλιματική ουδετερότητα στην Ευρωπαϊκή Ένωση

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## Περίληψη

Η Ευρωπαϊκή Ένωση (ΕΕ) έχει μειώσει σημαντικά τις καθαρές εκπομπές διοξειδίου του άνθρακα από το 2005. Ωστόσο, ο ρυθμός των μειώσεων πρέπει να επιταχυνθεί σημαντικά – υπερδιπλασιάζοντας τον μέσο ετήσιο ρυθμό που παρατηρήθηκε μεταξύ 2005 και 2022- εάν η ΕΕ θέλει να πετύχει τους τον στόχο για το 2030 για τουλάχιστον 55% καθαρή μείωση των εκπομπών σε σύγκριση με τα επίπεδα του 1990 και την κλιματική ουδετερότητα έως το 2050. Απαιτούνται επιπλέον προσπάθειες σε όλους τους τομείς όπως ενέργεια, μεταφορές,

[1] This paper contribution is based on the report of the European Scientific Advisory Board on Climate Change entitled "Towards EU climate neutrality: progress, policy gaps and opportunities", 2024. The full report is provided at https://climate-advisory-board.europa.eu/reports-and-publications/towards-eu-climate-neutrality-progress-policy-gaps-and-opportunities.

βιομηχανία, κτήρια, κ.α. Επιπρόσθετα χρειάζεται προσοχή στον τομέα χρήσης γης, της αλλαγής χρήσης γης και της δασοκομίας όπου η απορρόφηση άνθρακα έχει μειωθεί απότομα από το 2015. Η επίτευξη του στόχου για το 2030 εξαρτάται από την αποτελεσματική εφαρμογή του νομοθετικού πακέτου 'Fit for 55' ειδικά σε εθνικό επίπεδο. Το κείμενο που ακολουθεί παρέχει μια σύντομη επισκόπηση των στόχων της ΕΕ για το κλίμα και παρουσιάζει βασικά ευρήματα και συστάσεις από την Ευρωπαϊκή Επιστημονική Συμβουλευτική Επιτροπή για την Κλιματική Αλλαγή σχετικά με τη συνέπεια των μέτρων της ΕΕ και των εθνικών μέτρων με τους γενικούς στόχους κλιματικής ουδετερότητας.

**Λέξεις Κλειδιά:** Ευρωπαϊκός Κλιματικός Νόμος, κλιματική φιλοδοξία, κλιματική ουδετερότητα, εκπομπές αερίων του θερμοκηπίου, δίκαιη μετάβαση.

## 1. The European Union's Climate Ambition

The EU's climate ambition to achieve net-zero greenhouse gas emissions by 2050, followed by net-negative emissions, is based on a comprehensive road map for transitioning to a sustainable, competitive, and climate-resilient economy. Central to this road map are several key components designed to drive the EU towards its 2050 goals:

(a) the European Climate Law adopted in 2021, establishing an intermediate target of reducing greenhouse gas (GHG) emissions by at least 55% by 2030 compared to 1990 levels and requiring regular assessment of progress by the European Commission and adjustments to ensure compliance. The target for the reduction of GHG emissions by 2040 is not yet legislated, whereas the Advisory Board has recommended that the target be set at 90-95% relative to 1990 levels (Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050; 2023).

(b) the European Green Deal, namely the strategic framework launched in 2019 to make Europe the first climate-neutral continent by means of measures in such sectors as energy, transport, agriculture, industry, and finance and in close alliance to such initiatives as the Circular Economy Action Plan, Farm to Fork Strategy, and Biodiversity Strategy.

(c ) the Fit for 55 Package, namely a legislative package designed to align the EU's climate, energy, and transport laws with the 2030 reduction target. Key elements include:

(c1) the strengthening of the EU Emissions Trading System (ETS), also introducing a separate system for buildings and road transport,

(c2) increasing the share of renewables to at least 42.5% by 2030 and boosting energy savings across sectors and

(c3) preventing carbon leakage by imposing tariffs on imports of carbon-intensive products (the so-called Carbon Border Adjustment Mechanism - CBAM).

(d) the Just Transition Mechanism (JTM) that addresses social and environmental disparities to ensure an equitable transition.

At the same time, the European Union advocates for global climate action under the Paris Agreement, safeguards societal well-being as well as its economic competitiveness while implementing its climate goals. enhances its energy security – especially after the energy crisis that resulted from Russia's war of aggression against Ukraine - to reduce its dependence on fossil fuel imports, seeks to support and renew European industry and make its products more competitive in the global market, and promotes research in cutting-edge sectors where the EU currently lags China and the USA.

## 2. Remaining on track to meet the climate objectives

To ensure that the EU and its Member States remain on track to meet their climate objectives, the European Climate Law foresees a regular assessment of progress made towards them, together with an assessment of whether EU and national measures are consistent with the climate neutrality objective. Such an assessment was carried out in 2024 by the European Scientific Advisory Board on Climate Change with the main findings and recommendations for achieving the EU's climate objectives being:

*Main findings*

The EU has substantially reduced its net GHG emissions since 2005 and largely exceeded its 20% reduction target by 2020, compared to 1990. In 2022, the EU reduced its net GHG emissions by 31% compared to 1990 levels. It surpassed the 20% reduction target for 2020, and trends over the past 5 years show an increase of average emissions reductions. However, achieving the EU's 55% objective for 2030, the average annual reductions during the 2022- 2030 period should be more than twice those observed on average in 2005-2022, while more efforts are needed across all sectors and particularly in buildings, transport, agriculture and forestry.

*Recommendations*

Based on an assessment of more than 80 indicators, the Advisory Board outlined a set of key recommendations for a more effective implementation and design of the EU climate policy framework:

There is an urgent need for Member States to accelerate emissions reductions and reverse the declining EU carbon sink promptly. Given the delays in implementing emission reductions, enforcement actions by the European Commission may become necessary to ensure that national energy and climate plans (NECPs) fully comply with the Governance Regulation requirements.

Adopting pending EU legislative initiatives is critical to supporting the required emissions reductions. One key initiative is the revision of the Energy Taxation Directive (ETD) to align energy taxation with the EU's climate goals. This revision is a cornerstone of the "Fit for 55" package, which seeks to cut greenhouse gas emissions by 55% by 2030. Key measures include phasing out fossil fuel subsidies, setting higher minimum tax rates for fossil fuels, and eliminating environmentally harmful tax exemptions for sectors like aviation, maritime, and professional road transport.

Scaling up renewable energy, particularly wind and solar photovoltaics (PV), is essential. Stable investment conditions must be ensured at both EU and national levels to drive this transition effectively.

Phasing out fossil fuel subsidies across the EU is another pressing priority. Support currently directed at vulnerable households should be reallocated to targeted interventions that mitigate regressive effects while promoting energy efficiency and the transition to renewable energy sources (RES).

EU policies must align more closely with the 2050 climate neutrality goal. This includes reforms in energy infrastructure, such as the Trans-European Networks for Energy, as well as adjustments in financial mechanisms like the EU Taxonomy, industrial emission regulations, and state aid rules. A consistent and climate-neutral policy framework is essential to phase out fossil fuels and achieve long-term objectives.

Improving EU climate governance and compliance frameworks is necessary. National long-term strategies (LTSs) should undergo iterative reviews, and more robust compliance mechanisms should be considered. Particular focus is required on Member States' obligations under the Effort Sharing and land use, land-use change, and forestry sector (LULUCF) Regulations to reduce emissions in sectors not covered by the EU Emissions Trading System (ETS).

The two EU emissions trading systems (ETS and ETS 2) must be made fit to support the net-zero target. Lessons from the initial years of ETS 2, covering buildings, road transport, and other sectors, should support future adjustments. Beyond 2030, a sufficiently high carbon price is essential to drive emissions reductions and ensure convergence between the two systems.

Ensuring a just transition is vital. Policies should systematically assess and evaluate the socio-economic impacts of climate actions to ensure equitable implementation and minimize unintended consequences.

Stronger incentives are needed to drive climate action in the agricultural sector and food systems. Potential measures include setting standalone emissions reduction targets, implementing mandatory practices to reduce methane and nitrous oxide emissions, increasing soil carbon, and shifting Common Agricultural Policy (CAP) support towards lower-emission practices and economic diversification.

Efforts to deploy carbon capture and storage/utilization, hydrogen, and bioenergy should prioritize activities with limited or no alternative mitigation options. These technologies must be targeted to maximize their impact. Furthermore, EU-level incentives for carbon removals should be introduced.

Increasing public and private investments in climate mitigation requires extending the EU's common debt approach under the Recovery and Resilience Facility (RRF) beyond 2026. This would provide certainty to investors and bolster public funding for climate initiatives.

Reducing energy and material demand is essential for achieving climate goals. Strengthened policies should promote energy and material efficiency while encouraging behavioral changes in mobility, housing, material use, and diets. Initiatives such as a legislative framework for sustainable food systems, regulations on railway infrastructure, and mandatory green public procurement requirements should be prioritized.

Expanding the EU's greenhouse gas (GHG) pricing regime to include all major sectors, such as agriculture, food, and upstream fossil fuel operations, is crucial. These actions must account for potential economic and social impacts, particularly on small farms and vulnerable regions, with measures in place to ensure a just and fair transition.

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ΑΡΘΡΑ
ARTICLES

# Climate economics: central themes and evolving debates

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## Abstract

This paper examines central themes in climate economics by addressing three interlinked questions: Why has the economy failed to protect us from climate change? What is the optimal level of climate change mitigation? What are the best means to achieve these goals? The evolving debates and approaches economists have taken to answer these questions have profoundly shaped the broader discussion on the strength and strategies of climate action.

**Keywords:**Climate economics, climate change mitigation, carbon pricing, climate-economy models, sustainability

# Οικονομική του Κλίματος: Κεντρικά θέματα και εξελισσόμενες συζητήσεις

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## Περίληψη

Αυτό το άρθρο εξετάζει κεντρικά θέματα της οικονομικής του κλίματος, απαντώντας σε τρία αλληλένδετα ερωτήματα: Γιατί η οικονομία απέτυχε να μας προστατεύσει από την κλιματική αλλαγή; Ποιο είναι το βέλτιστο επίπεδο μετριασμού της κλιματικής αλλαγής; Ποια είναι τα καλύτερα μέσα για την επίτευξη αυτών των στόχων; Οι εξελισσόμενες συζητήσεις και οι προσεγγίσεις που έχουν υιοθετήσει οι οικονομολόγοι για να απαντήσουν σε αυτά τα ερωτήματα έχουν διαμορφώσει καθοριστικά τον ευρύτερο διάλογο σχετικά με τη δύναμη και τις στρατηγικές της κλιματικής δράσης.

**Λέξεις κλειδιά:** οικονομική του κλίματος, μετριασμός της κλιματικής αλλαγής, τιμές άνθρακα, υποδείγματα κλίματος-οικονομίας, βιωσιμότητα

## 1. Introduction

Three broad and interlinked questions set the scene for economic analysis of climate change or climate economics. Why does the economy fail to protect our climate? What level of climate change should we aim for? What policy tools are needed to achieve our climate goals? How economists have attempted to answer these questions has had a profound impact on the broader debate about such matters as how strong climate action should be, what are the costs of the energy transition, what kinds of climate policies should governments pursue.

A well-functioning economy is expected to manage all resources in a way that advances our welfare. There are many reasons why the market system may fail to do so, mismanaging, wasting or damaging valuable resources. Several market failures have contributed to damaging anthropogenic climate change that far outweighs the benefits of using our atmosphere as a repository for our greenhouse gas emissions. In an ideal market system resources are protected by property rights. Until recently there were no property rights, or other forms of protection, in the use of the atmosphere to deposit greenhouse gas emissions. The atmosphere was treated as an open access resource, as if it had an infinite capacity to absorb our emissions while maintaining critical services like keeping temperatures and weather variability at levels that sustain our wellbeing. The lack of property rights means that no one pays a price for the right to emit greenhouse gases. It is treated as a free resource when in fact it is a critically valuable scarce resource. So, one important reason the economy fails to protect our climate, is that unlike most other resources like oil, natural gas, iron ore and silicon chips, there are no property rights for its use and no price to register its scarcity. This leads to overexploitation of greenhouse gas assimilating services of the atmosphere that directly competes with the vital climate regulating services of the atmosphere.

What further aggravates this problem is that greenhouse gases contribute to climate change from wherever the emissions arise. The climate regulating services of our atmosphere is a global public good and there is no single jurisdiction that can set global regulations or property rights. As each country emits greenhouse gases, they generate damages to all other countries while only incurring a small fraction of these damages. No country, on its own, has an adequate incentive to curb their emissions or to address this market failure by taking action to limit greenhouse gas emissions.

Another market failure is that the private sector has inadequate incentives to invest in research and development of technologies like renewables that do not damage our atmosphere. The initial investment in research and development can be very costly but most of the benefits of new knowledge and learning accrue to other companies that have not put in the effort and expense. The private sector will underinvest in the needed technologies to address climate change.

If there are failures preventing the market system from protecting nature's vital atmospheric climatic services, how can we correct these failures and how do we know what the right uses of the atmosphere are or what level of climate

change is acceptable? On the latter question economists try to identify and measure potential benefits and costs of using the atmosphere as a waste depository of greenhouse gases. Burning fossil fuels have been a very cheap and an effective way of heating our homes, providing transportation, generating electricity, and producing many critical materials like cement, steel and fertilizers. It's hard to imagine the great strides in world development that started with the Industrial Revolution without our access and use of coal, oil and gas. These benefits come with increasing costs in terms of climate change and the associated damages like rising sea level, heat waves, floods and extreme weather. Economists build models to measure, project and compare the benefits of our fossil intensive energy system against the costs of using our atmosphere for dumping our greenhouse gases. Besides helping us better understand the potential economic impacts of climate change these have been used to suggest the 'right' level of climate change.

Having a good understanding of how the economy fails to protect us from climate change and the related question of what level of protection we should aim for is key to designing policies, instruments and institutions to correct or supplant the market system. While it would be nice to imagine an economic system that automatically gauges the health of the environment and appropriately incentivizes us to take the right decisions, or self regulates, the nature of climate change requires a central role for governments. Governments need to set targets for greenhouse gas emission reductions and develop the regulatory framework that will achieve these. Once targets for limiting greenhouse gas emissions have been set (with or without the help of economic analysis) the focus of climate economics turns to the most effective means or instruments to achieve these targets. Besides mitigation of greenhouse gases there are two other main dimensions of economic analysis. Economies need to adapt to the new conditions that result from climate change and here again there is the question of how many resources need to be invested, and by what means, in protecting our wealth and health from potential damages. In addition, as the world transitions to a low or zero carbon economy we need to ensure that our economies are resilient to these new conditions.

This paper will focus on some of the central themes of climate economics by presenting the ways that economists have attempted to answer the three interlinked questions: Why the economy has failed us? What is the right level of climate change and thus climate action? What are the best means of achieving our goals? Section 2 will investigate the special challenges of climate change to economics and how economists have been modeling the interaction between the economy and climate change. Section 3 will present criticisms of the early climate-economy models that have important implications on how economists have evolved their views on the need for strong and early climate action. Section 4 will explain the importance placed by economists on the role of carbon prices, whether in the form of a carbon tax or emissions trading system. Section 5 will present the need for complementary policies to carbon prices and a holistic systems approach to climate change.

## 2. Challenges of climate change to economics and economic modelling

### 2.1 What makes climate change a special challenge for economics

There are several features of climate change that together make it unique among environmental challenges to the economy, a specially wicked problem. We have already referred to one which is the global nature of climate change that requires action at a global level. If one country adopts tougher mitigation then carbon leakage can occur where greenhouse gas industries migrate to other less regulated regions, largely voiding the benefits of the initial mitigation. Climate change is also special due to the long-time horizon between the moment of emissions and the physical impacts of accumulated greenhouse gases in the atmosphere. This strong temporal disconnect between those generating the damages and those experiencing the damages severely blunts any incentives to mitigate emissions, especially when action may be costly or perceived as such.

Climate change is characterized by radical uncertainty along so many dimensions including the magnitude of future impacts, the regional variability of impacts, the unpredictable nature of potential tipping points like the ice sheet collapse or permafrost thaw, the long term economic consequences of climate change, the ecological impacts like species responses and ecosystem disruptions as well as the broader human responses to climate change in terms of future mitigation, adaptation actions, geopolitical shifts, migration, etc. As we will see the nature of uncertainty of climate change can strongly influence the way economists model the phenomenon and the usefulness of models in guiding action.

Any effort to effectively mitigate greenhouse gases requires broad based system changes across sectors and across economies, like how we produce and consume energy, how we build are cities, how our transport system works, how we direct technological change, how we produce food, and how our trade and finance systems work. The sheer scale of the needed changes and the way these changes are interdependent and need to take place in tandem add to the uniqueness of the challenge for economics. For instance, to move rapidly to electric vehicles we need technological advancements in batteries, recharging infrastructure, new resource demands, expansion of renewables. The broad expansion in use of electric vehicles with appropriate changes to the grid so that car owners can sell energy from their batteries while they are parked will further reduce the cost of owning an electric vehicle and will help balance the fluctuations of energy related to renewables.

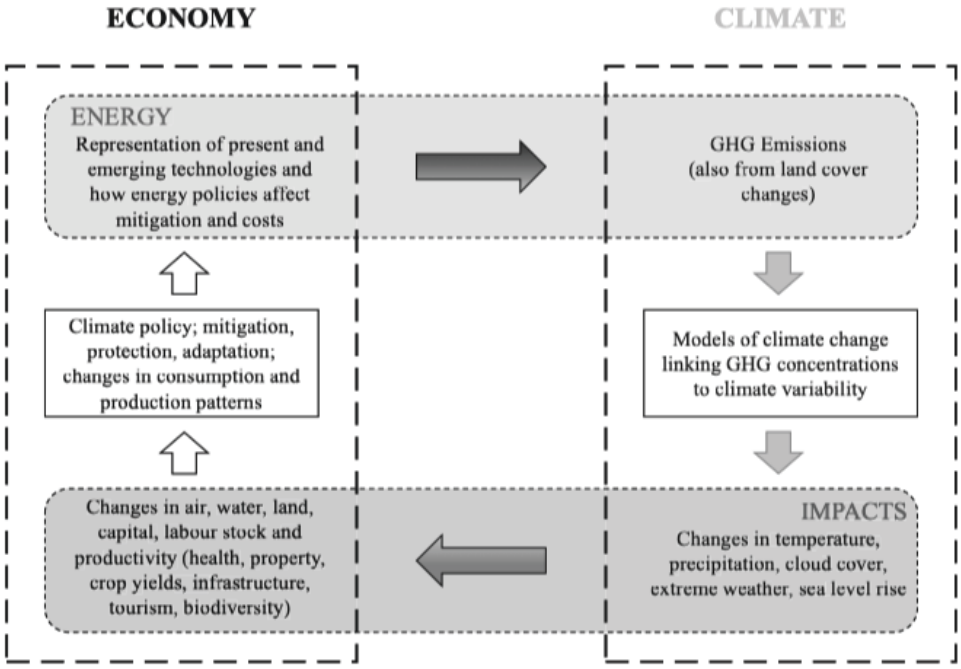
Many of these unique features of climate change pose special challenges to economics that raise fundamental questions, inter alia, of how economists model the climate-economy interaction and their underlying assumptions.

## 2.2 Two main types of economic analysis

An important part of climate economics has been the development and use of models incorporating the interaction of the economy with the climate. Models can be used to illuminate specific elements like understanding the economic impact of climate change to agriculture, how agriculture can adapt to climate change or reduce greenhouse gas emissions, and the best policy instruments to achieve these aims. Two broad types of models are bottom-up models that tend to be detailed and focuses on a specific sector like energy, forestry, tourism or transportation, and top-down models that look at the whole economy or global economy and are more abstract focusing on major trends like population growth, broad technological development, levels of consumption (GDP) and how these interact with climate change. Top-down models are called Integrated Assessment Models or IAMs in that they integrate climate models with models of the economy.

Broadly speaking the following interlinked chain of interactions are modeled in top-down models. Human-induced climate change results from increases in GHG emissions and their levels of concentration in the atmosphere. Levels of emissions resulting from economic activity will depend on population growth, technological advancement, forms of production and patterns of consumption. Climate science tells us how different concentration levels of GHGs may affect the temperature, precipitation, cloud formation, wind and sea level rise. These in turn lead to different physical, environmental and social impacts like change in mortality rates, crop yields, water supply, species loss and migration. Physical impacts can be translated into monetary terms to provide a common metric of damages or benefits to a sector or the entire economy. The figure below depicts the circular nature of interaction as the economy generates emissions changing the climate which leads to physical impacts affecting the economy and its emissions. There is a bewildering array of climate-economy models that vary by the different ways parts of this highly interconnected process are modeled and the differing assumptions made (Nikas et al., 2018).

**Figure 1:**
**Climate-economy dynamics with four modules: Economy, climate, impacts, and energy**




Source: Nikas et al. ( 2018)

### 2.3 Climate-Economy models or Integrated Assessment Models

Integrated Assessment Models have played an outsized role in framing the economic debate around climate change and in shaping economists' views on the timing and strength of action needed to mitigate climate change. These models were first used in the Intergovernmental Panel on Climate Change (IPCC) reports in the Second Assessment Report in 1995. IAMs became more central in subsequent IPCC reports where they are used extensively to model scenarios and provide economic estimates of potential damages from climate change and the economic implications of different policy choices and mitigation pathways. Though they are not used by the IPCC to recommend a specific target for climate change, this has been a key focus of many such models and has influenced the broader debate on the urgency of climate action.

William D. Nordhaus is the pioneer in building integrated assessment models and received the Nobel Prize in Economics in 2018 for his contribution. He

developed the Dynamic Integrated Climate-Economy (DICE) model in the early 1990s. The model combines a simplified representation of the global economy with a model of the Earth's climate system[1]. It models how the global economy grows over time where greenhouse gas emissions increase if there is no abatement policy. Rising $CO_2$ concentrations lead to climate change which in turn imposes ecological and economic impacts. The impacts can be addressed by policies that mitigate emissions. Such policies mean that societies give up consumption today to reduce damages in the future. All damages and costs are measured in monetary units. Higher growth early on leads to higher consumption and welfare but also higher damages. The main objective of the model is to allow the comparison of outcomes and welfare of different policies. The model "is a highly simplified representation of the complex economic and geophysical realities" (Barrage & Nordhaus, 2024). While such simplicity has many disadvantages it offers transparency and versatility allowing researchers to consider the implications of different assumptions.

The model is also used to determine the optimal policy or levels of mitigating $CO_2$ emissions that maximizes welfare over time. This entails an optimal trajectory of economic growth, levels of emissions, and increases in global mean temperature. There have been many revisions of the DICE model since its first development. Revisions reflect changing assumptions and refinements with advances in knowledge related to both the economic and climate components of the model. The latest version is DICE-2023 is described in Barrage & Nordhaus (2024). The baseline scenario estimates current policies as of 2023 and extends them indefinitely. The associated temperature change for 2100 is 3.6 °C. The optimal scenario that maximizes welfare leads to 2.6 °C by 2100.

The fact that this and many other IAMs have suggested that policy should aim at higher levels than the Paris target of holding global average temperature at well below 2 °C and pursuing efforts to limit the rise to 1.5 °C relative to pre-industrial levels, has been a source of controversy. Among economists the controversy goes back many years and older variations of DICE models have suggested even higher optimal levels of global average temperatures for 2100. For instance in the previous DICE-2016R3 model the optimal temperature by 2100 rises to over 3 °C (Nordhaus, 2019).[2] From the outset DICE models (and many other IAMs) prescribed moderate climate action as they tended, according to critics, to greatly underestimate the damages associated with climate change in the future and overestimate the costs of transitioning away from fossil fuels.

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[1] For an introduction to several of the central themes of climate economics see Nordhaus ( 2021). Tol (2023) also provides a good textbook account of many of these themes as well as an introduction to integrated assessment models and DICE. Roos & Hoffart (2020) also introduce climate economics while presenting alternative perspectives to mainstream approaches.

[2] Glanemann et al. (2020) use an older DICE model but incorporate other assumptions and show that an optimal policy comes very close to the politically determined Paris Agreement target of below 2 °C.

## 3. Economic arguments for stronger climate action

From the earliest climate-economy models in the 1990s many economists had raised serious concerns about how they were formed and their underlying assumptions. An important landmark was the Stern Review of the Economics of Climate Change (2006) that had been commissioned by Tony Blair's government in 2005 (Stern, 2007).[3] It had the impact of greatly raising awareness among the public about the economics of climate change and provided a fundamentally different narrative to economists' mainstream view of climate action. In contrast to the dominant climate-economy models of the time that suggested a long-term rise in global average temperature around 3°C would be optimal and that mild and gradual mitigation was warranted, the Stern Review argued that the economics of climate change required far more aggressive and immediate climate action. It did so by providing a far more expansive economic analysis of climate change and by questioning many of the central assumptions of many IAMs. In the following sections I will present some of the key assumptions of many IAMs that have come under attack, starting with the role of discounting.

### 3.1 Discounting matters: weighing benefits and costs across time

Because money and resources today are worth more today than in the future, economists use a discount rate when comparing values across time. Most people prefer to receive €100 today than €100 in the future and may even prefer €100 today to €105 in a year's time. We thus need to account for the different value of a benefit or money at different times when comparing values across time. Another reason future values are discounted is that money today can be invested and grows over time. With a 5% interest rate investing €100 today would give you €105 in a year or €13150 in 100 years. So, with a 5% discount rate we would put a weight (or discount) on any value in 100 years of less than 1% (0.76% to be precise) when comparing it to present day amounts. A damage of €10.000 in 100 years would be treated as equivalent to a damage of €76 today. This illustrates the profound impact of discounting future values.

Since the costs of mitigation are mostly in the near future while the greatest damages of climate change appear in the more distant future, the rate at which these future damages are discounted strongly influences the 'optimal' emissions path. High discount rates mean that we place less value on future damages, so climate change appears less of a threat. The selection of discount rates in climate-economic models is a subject of intense debate involving both empirical and ethical considerations about the valuation of future wellbeing.

Strong arguments have been put forward to support the use of a very low discount rate. There are many factors that influence the choice of discount rate. One factor relates to differentiating how a single person compares values over time to how society should make comparisons of values across generations. Most indi-

[3] See also Stern (2008) that provides a great overview of the Stern Review.

viduals tend to value immediate consumption more highly over future consumption. While this may be a reason to put a higher value on benefits or costs in the present within a person's lifetime it does not warrant putting lower values on benefits and costs on people that haven't yet been born. We should not put a lower weight on future lives just because they are born later.

Another important factor influencing the choice of discount rates is the expected growth of the world economy in the future. If modelers assume a high growth rate this will mean that future generations will be much better off so any damages to them should be weighed less when compared to damages or sacrifices in the present from shouldering costly mitigation. If on the other hand, climate change is likely to lower growth rates and leave future generations worse off than the present, we have a greater responsibility in undertaking mitigation.

There is already a vast literature on the issue of how to select the appropriate discount rate for climate-economy model, but the growing consensus is towards the use of a low discount rate.

### 3.2 Most likely or worse outcomes

Another critical issue in climate-economy models has to do with how they understand and model uncertainty. Uncertainty pervades all aspects of climate change whether considering the potential physical impacts resulting from climate change or how the economy will contribute to climate change, the pace of technological advancement, the form of policy interventions, or the changing winds of politics. Unavoidably we must make decisions in the presence of these many and often deep uncertainties. One critical uncertainty is the extent of future damages we can expect from climate change. Some climate-economy models incorporate varying risks about future damages by associating probabilities to different levels of damages and then estimating a weighted average of the damage to our welfare. Very high damages may be less likely so they will be given a lower probability with more likely mid-levels of damages getting a higher probability. By adding the weighted average of these damages to our welfare we get something like the central value or most likely damages. This is then used in determining an optimal climate policy.

A problem with this approach is that we don't really have any good estimates of the probabilities associated with future damages from climate change and climate action. As we delay climate action the needed energy transition may become highly disruptive and costly, or as we broach tipping points that are hard to predict we may have cascading extreme climate events like the complete melting of the Greenland ice sheet. In addition, as climate change at the present pace has no precedent in human history highly catastrophic damages cannot be ruled out and may have non-negligible probabilities. Weitzman (2009) sets out what he called the "Dismal Theory" in that if a future catastrophe had a non-negligible probability, then these damages would overwhelm any costs of climate action and the IAMs would recommend that present generations pay an infinite amount

to avoid these. Whether we focus on what is a highly contentious 'most likely' scenario or frame our decision problem on the possibility of some catastrophic worse outcomes substantially affects our approach to climate action.

In many areas of our daily life, we focus on improbable bad outcomes and accordingly take a precautionary approach. Our house catching on fire is an unlikely outcome, but we take out insurance to protect ourselves from such severe outcomes. Airport security is not based on the most likely outcome but on preventing a worse scenario. The Atlantic Meridional Overturning Circulation (AMOC) is a crucial component of Earth's climate system, redistributing heat and influencing weather patterns, particularly in the North Atlantic region. While there are divergent views on the likelihood and timing of the collapse of the AMOC with profound global consequences, one recent study contends it is likely to occur within the century given present trends in global temperature (Ditlevsen & Ditlevsen, 2023).

Many prominent economists have suggested a precautionary or guardrail approach that views climate action as an insurance policy against potentially catastrophic damages and questions the value of optimizing approaches of climate-economy modeling (Stern & Stiglitz, 2021; Stern et al., 2022).

### 3.3 Other issues with modeling damages from climate change

There are many other aspects of climate-economy models that have been criticized by economists. For purposes of illustration, I mention just two more. Most IAMs reflect damages from a global temperature increase by a proportionate reduction in overall output of the economy when there is good reason to believe that damages will increase in a non-linear fashion with many tipping points. The possibility that there may be accelerating damages or dramatic worsening of climate damages after certain thresholds are passed alters the calculus of benefits and damages. Climate-economy models often do not consider how damages to vulnerable populations of the world that are least able to protect themselves should be weighed more heavily than damages to more affluent regions. Modified IAMs that incorporate equity weighting can lead to significantly higher damages from climate change (Schumacher, 2018).

### 3.4 The cost of decarbonization

Much of the debate on the limitations of climate-economy models has focused on the problems in modeling damages resulting from climate change. Much less attention has been given to how costs of mitigating greenhouse gases have been modeled.

IPCC (2022) find that mitigation pathways to reach 1.5°C that doesn't include the benefits of avoided climate change impacts nor co-benefits or co-harms of mitigation actions to involve an annualized reduction in consumption growth of 0.04 (median value) over the century. Despite these 'costs' of mitigation the economy achieves higher growth rates when compared to pathways without mitigation where climate damages are included in the scenarios. This does not clarify, however, how costs and benefits are distributed through time leaving open the question of how much needs to be sacrificed now to achieve better outcomes in the future.

The International Energy Agency (2021) estimates that the transition to a net-zero energy system requires a surge in clean energy investment of $4.5 trillion or three times 2021 levels. This investment could drive an average annual increase in global GDP growth by approximately 0.4% through 2030, through the creation of new industries and job opportunities in the clean energy sector.

Until recently most IAMs modeled technological change as exogenous so that advancements were predetermined over time and not influenced by policies or economic activities within the model. Improvements in energy efficiency, reductions in carbon intensity or cost declines for technologies were often derived from historical trends or expert judgments. No allowances were made for policy feedback where investment in research and development or the stringency of climate policies could accelerate technological advancement and cost reductions arising from learning by doing. Evidence from photovoltaics and wind energy have shown how policy support can lead to dramatic reductions in the costs of these technologies brought about through learning as the scale of production increased  Organizations like the International Energy Agency consistently underestimated the cost reductions in renewables. [4]

Even though there is strong evidence that policy can have a substantial impact on the direction and pace of technological advancement the difficulty in mathematically incorporating such dynamics in climate-economy models has hampered an appraisal of their impact.  More recent IAMs have started to incorporate such policy feedback and show that much higher and earlier investments in clean technologies are warranted than those suggested by earlier climate economy models (Grubb et al., 2024).

Criticisms of the form and assumptions underlying early climate-economy model have had a strong influence on the economics of climate change. Many climate-economy models have been reformulated to address these criticisms and to incorporate advances in our knowledge of how changes in average global temperature cause physical damages, how best to value and weigh benefits from reducing climate damages over time and how to project costs of mitigation and technological advances. What has become clear is that the model results are highly sensitive to the form of the model and its assumptions. Newer climate-economy models, like the DICE2023, have come much closer to aligning with the broader scientific community's and those making the case that climate economics, done properly, endorses strong and upfront climate action to ensure the welfare of this and future generations. We turn now to the issue of how climate economics has shaped our understanding about the right instruments or policy tools to mitigate greenhouse gases.

[4] See Grubb et al. (2021) how the omission of important elements of dynamic realism like inertia, induced innovation and path dependence has meant that IAMs have misspecified abatement costs and their dynamics. See Grubb et al. (2024) for an alternative climate economy model that incorporates dynamic technological change.

## 4. Putting a price on carbon

### 4.1 A carbon price

One area where there has generally been broad agreement among economists is the need for there to be a price that greenhouse gas emitters pay. This typically takes the form of a tax on carbon, or the price associated with a tradable emissions permit. A carbon tax is usually levied on carbon-based fossil fuels proportionally, in relation to the estimated amount of carbon in their production and use. It incentivizes consumers to save energy overall but also to direct their demand to alternative energy sources that generate less carbon emissions. This is its main purpose, but such carbon taxes have an additional benefit in that the revenues can be used to reduce other distortionary taxes like payroll taxes that increase the cost of hiring workers. They can also be used to reduce any regressive impacts of carbon prices on low-income households.

Economists argue that a carbon price is the most effective and least costly way of protecting us from climate change or decarbonizing the economy. Prices are the most flexible decentralized way that markets determine the right use of our resources. A carbon price is seen as correcting the key market failure associated with climate change in that the atmosphere is treated as a free open access resource when in fact it is highly valuable and scarce.

### 4.2 Tim Harford on the beauty of carbon tax

In an FT article Tim Hartford nicely captured the beauty of a carbon tax. He begins by pointing out how difficult it would be for consumers to voluntarily reduce emission.

"How bad is red wine? How bad is an iPhone? Collectively we make many billions of decisions every day about what to buy, how to travel and where to set the thermostat". We can't be expected to calculate the carbon footprint associated with everything we do. "The brilliance of a carbon tax is that we would not have to. The price of everything we buy is tied to the cost of resources required to make and deliver it. If something requires acres of land, tonnes of raw materials, megawatt-hours of energy and days of skilled labour, you can bet that it won't come cheap. The link between price and cost is fuzzy but real. Yet carbon emissions have not been reflected in that cost. A carbon tax changes that by making the climate impact as real a cost as any other. It sends a signal along all those supply chains, nudging every decision towards the lower-carbon alternative. A shopper may decide that a carbon-taxed T-shirt is too costly, but meanwhile the textile factory is looking to save on electricity, while the electricity supplier is switching to solar. Every part of the value chain becomes greener…From frugal shopping to efficient logistics to renewable sources of electricity, carbon taxes gently steer us towards the greener solution every time, whether we are racked with guilt or blithely unconcerned. They should be at the centre of our fight against climate change" (Harford, 2021).

### 4.3 Carbon markets

Emissions trading has evolved from a textbook idea Dales (1968) to a major instrument in pollution control. Economists view emissions trading systems and carbon taxes as essentially equally effective ways of mitigating emissions. While carbon taxes explicitly set a price or tax on emissions, emissions trading systems issue permits that allow the holder of the permit to emit a specified amount, e.g., in the EU ETS one emission allowance (permit) corresponds to one ton of carbon dioxide or an equivalent amount of another greenhouse gas covered by the system. These emissions allowances can be traded among entities. The total number of allowances available (the cap) is set by the authorities and these can be purchased at auctions or in a secondary market. The price of permits is determined by supply and demand.

Since greenhouse gas emissions have the same impact irrespective of the location or nature of the activity, the ideal would be to have a single global carbon price. This could either be a carbon tax that would rise through time until we reach zero emissions, as the cost of use fossil fuels becomes prohibitive, or it could be global carbon allowances with a cap that would fall over time until no more emissions are made available. A global carbon price would ensure that no country or economic activity is put at a disadvantage relative to others and would avoid carbon leakage, where entities emitting greenhouse gases shift their activities and emissions to jurisdictions with weaker regulations.

There have been lengthy debates about the relative merits of carbon taxes versus emissions trading systems. These debates have often been portrayed as one between supporters of government intervention demanding taxes versus supporters of the market that believe that an extension of markets (through allowances) to the polluting activities will solve the problem without government intervention. This debate draws on Coase's (1960) famous critique of Pigou (1920) who first recommended the use of taxes to correct market failures in the presence of negative externalities. Though there are differences between the two instruments it doesn't have to do with the extent of government intervention. Both a carbon tax and an emissions trading system require critical government design and oversight, and depending on the design of carbon taxes or emissions trading systems they can amount to the same thing (Stavins, 2022).

Most economists believe that some form of carbon price should be a central plank of mitigation policy (FT editorial board, 2024). Despite this broad and long-standing consensus carbon prices are underused and when they are implemented the carbon price or tax is generally too low to have the needed mitigation impact. According to the World Bank (2024) annual report on carbon prices, there are 75 carbon taxes and emissions trading schemes in operation worldwide. Carbon pricing instruments cover around 24% of global emissions and price levels are lower than that needed to achieve the Paris agreement goals. In 2023, carbon pricing revenues exceeded 100 billion for the first time and come mostly from ETSs. Still the contributions of these revenues to national budgets remains low.

To be on track to limit temperature below 2°C, the High-Level Commission on Carbon Prices concluded that carbon prices needed to be USD 40-80/ton of carbon dioxide equivalent ($tCO_2e$) in 2020 and rise to USD 50-100/$tCO_2e$ in 2030 (Stiglitz et al., 2017).

**4.4 Social Cost of Carbon and the right level of carbon prices**

Despite the strong consensus among economists for the need of a carbon price there has been some disagreement about the right level of such a price. This difference is directly related to the issue of how aggressive climate action should be. A key feature of the DICE model (and other IAMs) is something called the "social cost of carbon" or SCC. This is a monetary measure of the cost of an additional ton of $CO_2$ calculated by summing up all the future damages it causes (and discounting these to their present value). This is like saying, if I were to emit one ton of $CO_2$ today how much money would I need to set aside to pay for cumulative global damages I cause.[5] The social cost of carbon rises over time reflecting several reasons. For instance, additional emissions exacerbate cumulative concentrations which lead to greater damages. As economies and populations grow more damage can be done by physical climate impacts, damage will also be greater over time as ecosystems that currently act as carbon sinks are expected to become less effective. When the DICE model calculates the optimal emission path it also finds the optimal social cost of carbon. Along an optimal path for the economy the marginal damage caused by one ton of $CO_2$ will be equal to the marginal benefit of being able to emit an additional ton. This optimal social cost of carbon would also be the appropriate carbon price that emitters would need to pay to ensure that only optimal emissions take place at any given moment.

By setting a carbon price equal to this optimal marginal damage the regulators ensure that only optimal emissions will take place. In this respect many IAMs are used to help policy makers determine the right level of mitigation. If mitigation involves the imposition of a carbon tax, then the SCC might be recommended as the right level of such a tax. Alternatively, an emissions trading system would be seen as effective if the price of allowances aligns with the social cost of carbon.

In DICE2023 the optimal social cost of carbon in 2020 is \$50/$tCO_2$ and rises to \$125/$tCO_2$ in 2050. Barrage & Nordhaus (2024) also show that the price would have to be much higher to achieve a global average temperature below 2 °C. In 2020 the social cost of carbon would be \$75/$tCO_2$ and rises to \$213/$tCO_2$ in 2050. To give some perspective a \$75/$tCO_2$ would amount to roughly €0.16 per liter of petrol. The price of gasoline in Germany is about €1.74. This gives a sense of the impact such a carbon price would have on drivers. It would amount to about a 10% rise. Finally, they also state that global carbon price that reflects current policies in the world are \$6/$tCO_2$.

[5] See Carleton & Greenstone (2022) for a nice presentation of the role of the social cost of carbon and it's use in the United States. Stern & Stiglitz (2021) challenge the standard approach to assessing the social cost of carbon and suggest an alternative.

The point here is to observe that while economists influenced by some climate-economy models have generally recommended less aggressive climate action than would be needed to achieve the Paris Agreement goals, they have long espoused the use of a carbon price or tax that is far greater than most carbon taxes implemented to date. There is broad consensus among economists that the world should be implementing a much higher carbon price or tax than we find in most jurisdictions. The European Union has implemented one of the most comprehensive carbon pricing mechanisms globally, covering a wide array of sectors, and is therefore close to the ideal supported by economists.

**4.5 The European Union Emissions Trading System**

The European Union Emissions Trading System is the oldest and largest of all the emissions trading systems in operation around the world. Under the system a cap is set on the total greenhouse gases that can be emitted in each time period. This cap is reduced annually to align with the EU climate target. The EU ETS was launched in 2005 and operates in phases. Phase 1 (2005-2007) was the pilot phase that covered only carbon dioxide emissions and focused on large emitters from energy-intensive industries including power plants, oil refineries and cement factories. A cap was set on emissions, and the initial allowances were mostly allocated for free based on historical emissions. Over-allocation of allowances along with lack of robust monitoring and verification mechanisms led to a collapse of carbon prices by the end of the phase. While subsequent phases of the EU ETS addressed some of the issues new challenges appeared. The financial crisis of 2008 reduced industrial activity and emissions and thus the demand for allowances. Other policies that also led to reduced emissions, like renewable energy and energy efficiency policies further reduced the demand for allowances. In addition, surpluses of allowances from earlier phases continued to suppress carbon prices.

In the present Phase 4 of the EU ETS (2021-2030) several innovations have strengthened the system. A larger proportion of allowances are auctioned than distributed for free. The overall emissions cap is reduced annually by 2.2%, up from 1.7% in Phase 3. The Market Stability Reserve (MSR) introduced in Phase 3 to prevent the collapse of carbon prices (and offer greater stability) by withdrawing allowances when there is an oversupply has been made more effective. These and other reforms have led to a significant increase in the carbon price which had been lower than €20 euros per metric ton of carbon dioxide equivalent ($CO_2e$) between 2007 and 2020 and since 2022 has mostly fluctuated between €60 and €100 euros. Besides a strengthening of of the system, the Fit for 55 package of reforms and new legislation has extended the ETS to cover maritime transport and a new, separate ETS 2 has been introduced for buildings and road transport emissions, and waste incineration is likely to be added in the near future. In this sense, the EU comes closest to following the prescription of economists on the use of a broad-based carbon price and in terms of the stringency or level of carbon price.

## 5. Beyond carbon pricing

Despite the merits of carbon pricing, it has been more the exception than the rule when it comes to implementation of climate policies. For several reasons, carbon taxes and emissions trading have been resisted strenuously by industry relative to other regulatory measures, particularly when compared to measures like direct subsidies for clean technologies or voluntary standards. One strength of carbon prices is that they are very transparent and thus not prone to capture from influence groups relative to detailed and opaque regulations (Helm, 2010; Sunstein, 2005). However, this strength is also a weakness when it comes to public perception. The very visibility of carbon prices makes an easy target. The use of carbon prices is also unpopular to the broader public as illustrated by the gilets jaunts (yellow vests) in France when Macron attempted to impose a carbon tax. They are perceived as regressive though appropriately designed they are not. Instead, people seem to prefer non price policies like green infrastructure programs, bans on polluting cars in city centers, subsidies for green technologies, etc. (Dechezlepretre et al. 2022; Ewald et al. 2022), even though these are likely to impose substantially greater costs.

Traditionally, regulatory approaches in the form of command-and-control climate policies have been the norm. These include such measures as emission limits for specific industries or facilities, mandates for technology standards, fuel economy standards, renewable energy mandates, building codes and outright bans on coal or internal combustion vehicles by a certain date. Economists have usually favored the broad use of a single carbon price to a possible patchwork of different non flexible standards across regions and sectors. The primary reason being the cost effectiveness of a carbon price, i.e., that it will achieve the greatest reduction in emissions at the least cost to society. Subsidies for insulation or boilers may be popular measures since their cost is not seen by those receiving the support though they may be a far more expensive way of reducing emissions. Early support for renewables reached a cost of over €1000 per ton of $CO_2$ emissions saved but this cost is not apparent to the voter who ends up paying it through other taxes (Blanchard et al., 2023).[6]

For all the elegance and advantages of carbon pricing it is very hard to envisage a global carbon mechanism or market, though efforts at harmonizing carbon prices among countries and regions are likely to increase. In some sectors like shipping and aviation with separate global governance institutions we are more likely to see the implementation of global carbon prices. But even if carbon prices could be implemented as envisaged by economists, and though they still should be the main

[6] It should be noted however, that such support while expensive at the time helped the development of a new renewables industry that eventually through learning by doing and scale brought about dramatic reductions in costs of clean technologies. The failure of the market to account for the positive externalities of research and development and the impact of the scale of activity on costs is different from the negative externality related directly to greenhouse gas emissions.

mitigation policy, there remain important reasons for pursuing additional complementary climate policies including such command-and-control instruments like industry standards, bans on internal combustion cars after a certain date, and targeted adoption incentives for clean energy and energy efficient products.

Both markets and governments are a far cry from the ideal systems envisage in most economic models. Indeed, this has been another reason why many climate-economy models have been criticized as they tended to treat the economy like an ideal market. There are many market and government failures that are highly relevant to climate change beyond the greenhouse externality (or the fact that the atmosphere has been an open resource for our emissions) that is seen as the primary cause of market failure. Putting a price on carbon addresses this key market failure but does not address other failures of the market that can strongly impact the transition to a low carbon economy.

Firms are unable to fully appropriate gains from their research and development in clean energy or other mitigation technologies. On their own they will lack the required incentives to advance our knowledge in this area. Even with a carbon price the market system will fall short of inducing the kind of technological change needed. Governments need to step in and support such research and development through tax incentives, direct funding of demonstration and deployment and publicly funded research. Capital markets are also imperfect making it difficult for firms and individuals to access capital even for privately profitable climate mitigation investments. For instance, a startup develops a new mitigation technology, but potential investors lack the knowledge to assess its profitability and demand higher returns to offset perceived risks. Institutional investors prioritize projects with quick paybacks over energy efficient infrastructure which may involve a longer payback period. A landlord is reluctant to invest in energy-efficient appliances for a rental property because tenants pay the utility bills. These market imperfections highlight the need for targeted policies and interventions such as green bonds, risk-sharing mechanisms, public subsidies, and regulatory reforms to address capital market failures and unlock profitable climate mitigation investments.

When it comes to addressing failures in the market system economic analysis of potential corrective measures typically assume that most of the market system is functioning well and piecemeal interventions in specific markets can provide the remedy, like imposing stricter regulations on a monopoly or limiting the amount of fishing that can take place to prevent overfishing. Any effort to effectively mitigate greenhouse gases requires broad based system changes across sectors and across economies, like how we produce and consume energy, how we build are cities, how our transport system works, how we direct technological change, how we produce food, and how our trade and finance systems work. An important aspect of the energy transition is the broad-based network and system changes needed that cannot be achieved by a single carbon price (Stern et al., 2022).

However high a carbon tax on fuel consumers will continue to purchase internal combustion cars if electric vehicles remain expensive, if there are not enough stations for recharging, or there isn't infrastructure for charging where people park their cars, or they can't service their cars or find parts easily. However cheap solar energy has become, and however their adoption is further incentivized by a carbon tax, without expansion in electricity distribution networks, their adoption is constrained. Support for renewables must go hand in hand with appropriate infrastructure development, like improved and extended distribution networks that go beyond borders. A carbon price may induce shipping companies to invest in energy efficiency measures, but without support for research in new zero carbon fuels like ammonia, hydrogen or carbon capture technologies, the available zero emissions technologies will simply not exist. Coordinated efforts will also be required throughout the shipping industry to ensure that ports have the facilities to support new energy forms, companies producing new clean fuels will need to reach a scale to provide for the industry, insurance companies will cover new safety issues associated with new fuels, ultimately the design of new ships will depend on the low carbon fuel that is best suited for the energy transition. For these complex networks of stakeholders to move at the pace required and in coordination so that infrastructure development is aligned with the market, new forms of regulation and governance are required.

Other policies are needed also to ensure appropriate compensation of those that bare the greatest brunt of the energy transition both for reasons of equality and justice but also for legitimizing climate action. In the case of a carbon tax or emission trading this must ensure that the most vulnerable receive a check from the revenues that will protect them from the higher costs but incentivize them to switch to cleaner energy options. In addition, there are important policies to ensure that a country that takes climate action protects its industry from potential loss in competition as well as avoiding carbon leakage. The EU's Carbon Border Adjustment Mechanism (CABM) is such a measure. It requires importers in the EU to purchase carbon certificates equivalent to the carbon price that would have been paid if the goods had been produced under the EU's Emissions Trading System (ETS). This applies to goods from countries that do not have comparable carbon pricing mechanisms or regulations in place. The cost is calculated based on the carbon footprint of the imported product. This not only protects EU industry form competition and carbon leakage it also incentivizes trading partners to take more action in reducing their emissions.

While economists have generally preferred flexible instruments like carbon pricing they increasingly recognize the need for many more complementary policies for effective climate action. This more holistic approach is needed given the special challenges associated with climate change in terms of the unprecedented breadth and pace of the system transition needed. The economics of climate change has been evolving from a focus on a single instrument like carbon prices to considering how a broader set of policies need to be implemented in a coordinated fashion. In addition, new roles are being envisaged for key economic ac-

tors. Governments have been considering new forms of green fiscal policy to help economies out of recession while boosting clean energy infrastructure. Policies are being advanced to make economies more circular so that waste products of one firm are used as inputs by another ensuring lower extraction and use of raw materials, energy saving and lower emissions. Central banks and the finance sector are developing new tools to strengthen financial flows toward the green transition while avoiding risks to the financial system from stranded assets in companies that are over invested in fossil fuels and their products. The very nature of the firm as seeking profits with disregard to broader stakeholder interests is put into question. New accounting and due diligence rules, like the EU Corporate Sustainable Reporting Directive and the Corporate Due Diligence Directive, are being implemented to ensure that companies are disclosing their climate impact and are bound to achieve reductions in greenhouse gases in line with the Paris Agreement. These developments are both the outcome of climate economics and are reshaping the way economists are thinking about the climate-economy nexus. The EU Green Deal, the Climate Law and Fit for 55 are both a product of this more holistic approach and a challenge to climate economics to strengthen its theory of broad-based systems transformations.

## 6. Conclusion

Economists are increasingly recognizing this broad new governance mandate. Their analytical tools have been shaped under the premise that the system generally works well and small-scale failures can be brought in line with highly targeted measures. They have not been trained to think in terms of whole systems change. This is a challenge that they are increasingly coming to grips with and are thinking about how a whole suite of measures that can work effectively together or avoid working at cross purposes (Meckling & Allan, 2020; Blanchard et al., 2023).

The fundamental questions that have defined climate economics remain pertinent here. Why do market systems fail to protect us from climate change? As we deepen our understanding of the many failures of markets, governments and institutions, we are in a better position to determine the best path to net zero as well as the forms and combinations of policies required to achieve this goal. The economics of climate change have been evolving. The first climate-economy models have come a long way in incorporating new research and taking on board criticisms of their underlying assumptions. As such their results come much closer to the broader scientific consensus on the need to meet the Paris Agreement goals. This is important because of the influence of the economic profession in policy circles and the broader public. There remain important reservations on the usefulness of these models in addressing certain issues, like the optimal path of decarbonization. An alternative approach given the deep uncertainty is to take a

precautionary or guardrail approach that suggests we do all we can to avoid playing dice with our future. Climate policy is not about acting optimally in the face of the most likely physical impacts, it is insurance against potentially catastrophic impacts that remain a real possibility.

Carbon pricing remains the first tool of choice for most economists and broad agreement exists about the need for much more stringent carbon pricing. Had politicians taken the advice of most economists that were calling for the implementation of carbon prices from the 1980s we would be at a much better place now. Why such instruments have proven so hard to implement is an important political economy question (Papandreou, 2016a; Papandreou, 2016b). Carbon prices today are not enough to bring about the necessary energy transition. Increasingly, climate economics is addressing the challenge of a whole system approach envisaging the use of multiple instruments and reappraising the roles of government, the private sector, civil society and individual behavior. This paper has focused on just a few of the central themes of climate economics and how these have evolved.

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# Climate Justice through International Courts and Tribunals: Advisory Opinions in the International Tribunal on the Law of the Sea (ITLOS), the Inter-American Court of Human Rights (IACtHR) and the International Court of Justice (ICJ)

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## Abstract

Climate change is the justice challenge of our century, and the increasingly serious impacts of climate change on human societies and ecosystems are raising important international legal challenges. States and stakeholders are appealing to international courts for clarity concerning their responsibilities in the global response to climate change, as well as their accountability for climate-related loss and damage. Through advisory proceedings, these institutions are being asked to clarify the legal obligations of States in addressing climate change, including the prevention of ocean impacts, the protection of human rights, and in international law more broadly. The International Tribunal for the Law of the Sea (ITLOS), the Inter-American Court of Human Rights (IACtHR) and the International Court of Justice (ICJ) are at the forefront of such proceedings with the potential to reshape international climate law and governance. In this article, expert legal scholars highlight the significance of climate advisory proceedings in these tribunals, briefly underlining the legal reasoning of the ITLOS advisory opinion, its implications for international climate governance, and the questions and arguments before the IACtHR and the ICJ. The article explores, in the context of global efforts to implement the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) and other climate litigation including in international courts and tribunals, the transformative potential of recent advisory opinions sought from the ITLOS, the IACtHR and the ICJ. In their responses to the pressing need for legal clarity in a world grappling with unprecedented climate challenges, the article suggests, courts are offered an historic opportunity to shape the contributions of international law to global sustainability, justice and the survival of life on Earth.

**Keywords:** climate change, climate litigation, international courts, international law, human rights.

# Η κλιματική δικαιοσύνη μέσα από τα διεθνή δικαστήρια: οι γνωμοδοτήσεις του Διεθνούς Δικαστηρίου Δικαίου της Θάλασσας (ΔΔΔΘ), του Διαμερικανικού Δικαστηρίου Ανθρωπίνων Δικαιωμάτων (ΔΔΑΔ) και του Διεθνούς Δικαστηρίου Δικαιοσύνης (ΔΔΔ)

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## Περίληψη

Η κλιματική αλλαγή είναι η πρόκληση της δικαιοσύνης του αιώνα μας και οι ολοένα πιο σοβαρές επιπτώσεις της στις ανθρώπινες κοινωνίες και τα οικοσυστήματα εγείρουν σημαντικές διεθνείς νομικές προκλήσεις. Τα κράτη και οι ενδιαφερόμενοι απευθύνονται στα διεθνή δικαστήρια προκειμένου να αποσαφηνίσουν τις υποχρεώσεις όσον αφορά την αντιμετώπιση της κλιματικής αλλαγής καθώς και για τις απώλειες και ζημίες. Μέσα από τη γνωμοδοτική διαδικασία, ζητείται από αυτούς τους θεσμούς να διευκρινίσουν τις νομικές υποχρεώσεις των κρατών για την αντιμετώπιση της κλιματικής αλλαγής, συμπεριλαμβανομένης της πρόληψης των επιπτώσεων στους ωκεανούς και της προστασίας των ανθρωπίνων δικαιωμάτων. Το Διεθνές Δικαστήριο για το Δίκαιο της Θάλασσας (ΔΔΔΘ), το Διαμερικανικό Δικαστήριο των Δικαιωμάτων του Ανθρώπου (ΔΔΔΑ) και το Διεθνές Δικαστήριο Δικαιοσύνης (ΔΔΔ) βρίσκονται στην πρώτη γραμμή τέτοιων διαδικασιών με τη δυνατότητα να αναδιαμορφώσουν το διεθνές δίκαιο και τη διακυβέρνηση για το κλίμα. Σε αυτό το άρθρο, ειδικοί νομικοί επιστήμονες υπογραμμίζουν τη σημασία των γνωμοδοτήσεων για το κλίμα, σχολιάζοντας το νομικό σκεπτικό της γνωμοδότησης του ΔΔΔΘ, τις επιπτώσεις της στη διεθνή διακυβέρνηση για το κλίμα και τα επιχειρήματα ενώπιον του ΔΔΔΑ και του ΔΔΔ. Το άρθρο διερευνά, στο πλαίσιο των παγκόσμιων προσπαθειών για την εφαρμογή της Συμφωνίας του Παρισιού τη μετασχηματιστική δυναμική των γνωμοδοτήσεων. Υποστηρίζει ότι μέσα από τις απαντήσεις τους στην πιεστική ανάγκη για νομική σαφήνεια σε ένα κόσμο που παλεύει με πρωτόγνωρες κλιματικές προκλήσεις, προσφέρεται στα δικαστήρια μια ιστορική ευκαιρία να διατυπώσουν τη συμβολή του διεθνούς δικαίου στην παγκόσμια βιωσιμότητα, τη δικαιοσύνη και τη διατήρηση της ζωής στη Γη.

**Λέξεις κλειδιά:** κλιματική αλλαγή, κλιματική δικαιοσύνη, διεθνή δικαστήρια, διεθνές δίκαιο, ανθρώπινα δικαιώματα.

## 1. Introduction[1]

Climate change is the justice challenge of our century, and the increasingly serious impacts of climate change on human societies and ecosystems are raising important international legal challenges.[2] States and stakeholders are appealing to international courts for clarity concerning their responsibilities in the global response to climate change, as well as their accountability for climate-related loss and damage.[3] Through climate litigation within countries, and also across borders through regional and international dispute settlement bodies, justice is being sought and obligations are being recognised.

Of particular note are recent requests to international courts and tribunals for advisory opinions on climate-related legal questions. Through advisory proceedings, these institutions are being asked to clarify the legal obligations of States in addressing climate change, including the prevention of ocean impacts, the protection of human rights, and in international law more broadly. The International Tribunal for the Law of the Sea (ITLOS), the Inter-American Court of Human Rights (IACtHR) and the International Court of Justice (ICJ) are at the forefront of such proceedings with the potential to reshape international climate law and governance.[4] This article highlights the significance of climate advisory proceedings in these tribunals, briefly underlining the legal reasoning of the ITLOS advisory opinion, its implications for international climate governance, and the questions and arguments before the IACtHR and the ICJ. It explores, in the con-

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[2] Marie-Claire Cordonier Segger and Christina Voigt (eds), Routledge Handbook of Climate Law and Governance: Courage, Contributions and Compliance (Taylor & Francis 2024).

[3] Marie-Claire Cordonier Segger et al, 'Defending the Defenders: State Responsibility to Respect Climate Justice, Rule of Law and Rights of Counsel in Climate Litigation Worldwide' in Ezio Costa Cordella and Pilar Moraga (eds), State Responsibilities in the Climate Crisis: Legal Standards and Global Litigation (Tirant lo Blanch 2024).

[4] Obligations of States in Respect of Climate Change (Request for Advisory Opinion) [2023] ICJ Rep (UNGA Res 77/276, 29 March 2023) https://www.icj-cij.org/sites/default/files/case-related/187/187-20230412-app-01-00-en.pdf accessed 12 January 2025; Commission of Small Island States on Climate Change and International Law (Request for Advisory Opinion) ITLOS Case No 31 (12 December 2022) https://www.itlos.org/en/cases/list-of-cases/request-for-advisory-opinion-31 accessed 12 January 2025; Request for an Advisory Opinion on the Climate Emergency and Human Rights, submitted by the Republic of Colombia and the Republic of Chile, IACtHR OC-1/23 (9 January 2023) https://corteidh.or.cr/docs/opiniones/soc_1_2023_en.pdf accessed 12 January 2025 and International Tribunal for the Law of the Sea (Advisory Opinion) ITLOS Case No 31 (21 May 2024) https://www.itlos.org/en/cases/list-of-cases/request-for-advisory-opinion-31 accessed 12 January 2025.

text of global efforts to implement the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) and other climate litigation including in international courts and tribunals, the transformative potential of recent advisory opinions sought from the ITLOS, the IACtHR and the ICJ as part of a response to the pressing need for legal clarity in a world grappling with unprecedented climate challenges.

## 2. The Rise of International Climate Litigation

International climate litigation, in particular efforts to seek advisory opinions and bring disputes addressing climate change to international courts and tribunals, has gained momentum in recent years. In recent decades, climate litigation was primarily focused on domestic courts, where plaintiffs sought to compel governments and corporations to reduce greenhouse gas emissions (GHG), to protect human rights affected by climate change, to prevent or adapt to the dangerous effects of climate change.[5] However, as science demonstrates persuasively, the global climate crisis is deepening.[6] And there has been a notable shift toward international judicial forums, where legal arguments transcend national borders and address the collective responsibility of States to mitigate GHG emissions, ensure adaptation and resilience, or redirect financial flows in relation climate change.

One of the key features of international climate litigation is a reliance, in many cases, on human rights obligations. The human rights impacts of climate change are profound, with vulnerable populations facing the loss of livelihoods, displacement, and threats to their right to life, health, and a clean environment.[7] Legal scholars and practitioners argue that climate change directly affects the enjoyment of fundamental human rights, creating a strong case for invoking international human rights law in litigation.

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[5] Jannika Jahn, "Domestic Courts as Guarantors of International Climate Cooperation: Insights from the German Constitutional Court's Climate Decision" (2023) 21 International Journal of Constitutional Law 859; Melanie Jean Murcott and Maria Antonia Tigre, "Developments, Opportunities, and Complexities in Global South Climate Litigation" (2024) 16 Journal of Human Rights Practice 1; César Rodríguez-Garavito, Litigating the Climate Emergency: How Human Rights, Courts, and Legal Mobilization Can Bolster Climate Action (Cambridge University Press 2022); Wolfgang Kahl and Marc-Philippe Weller (eds), Climate Change Litigation (Beck/Hart 2021).

[6] IPCC Sixth Assessment Report (AR6) Synthesis Report (2023), https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf; IPCC Special Report on Global Warming of 1.5°C (2018), https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf; IPCC Fifth Assessment Report (AR5) (2014), https://archive.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf ; and Global Stocktake Report Synthesis Report by the Co-Facilitators on the Technical Dialogue (2023), https://unfccc.int/sites/default/files/resource/sb2023_09E.pdf?download

[7] Sumudu Atapattu, Human Rights Approaches to Climate Change: Challenges and Opportunities (Routledge 2015).

Moreover, international climate litigation also draws on international climate law and governance, and international principles of law on sustainable development including precaution, sustainable use of natural resources, equity and integration.[8] These principles are enshrined in major international treaties on sustainable development, such as the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC),[9] the Convention on Biological Diversity[10] and the United Nations Convention on the Law of the Sea (UNCLOS).[11] Such instruments set the stage for the legal arguments in international climate litigation, particularly with regard to states' obligations to contribute to global mitigation efforts and take preventive measures, adapt to climate impacts and promote resilience, and redirect financial flows towards more sustainable development.

As noted by scholars, international courts and tribunals have long engaged with climate-related disputes,[12] and the recent advisory opinions on climate change are not the first instances where international law has intersected with environmental concerns. International courts have addressed a range of climate-related issues over the years, including the responsibility of states for environmental harm, the human rights implications of climate change, the need to secure more sustainable development of energy and other resources, and the growing role of international law in addressing collaboration on, and impacts of global climate change.[13] State responsibility is increasingly being invoked, driven by an increasing recognition of the legal obligations of States to mitigate climate change, strengthen adaptation and resilience, redirect financial flows, and address loss and damage due to climate change. Through various cases, including human rights litigation, investment arbitration, and state-to-state disputes, international courts have progressively clarified the scope of state responsibility in relation to climate change, laying the groundwork for future climate litigation.

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[8] International Law Association, New Dehli Declaration of Principles of International Law Relating to Sustainable Development, ILA Resolution 3/2002 (2002), https://www.ila-hq.org/en_GB/documents/conference-resolution-english-new-delhi-2002-3 International Law Association, Sofia Guiding Statements on Sustainable Development, ILA Resolution 7/2012 (2012) https://www.ila-hq.org/en_GB/documents/conference-resolution-english-sofia-2012-2 and International Law Association, Kyoto Guidelines on Sustainable Management of Natural Resources for Development, ILA Resolution 4/2020 (2020) see also Marie-Claire Cordonier Segger and Damilola Olawuyi, Sustainable Development Law: Principles, Practices and Prospects (2nd edn Oxford University Press 2025 forthcoming).

[9] Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UNTS 54113.

[10] Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79.

[11] United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3.

[12] Marie-Claire Cordonier Segger and HE Judge CG Weeramantry, Sustainable Development Principles in the Decisions of International Courts and Tribunals: 1992-2012 (Routledge 2017).

[13] Ibid.

One notable example is the Klimaseniorinnen case, brought before the European Court of Human Rights (ECtHR) by a group of elderly women in Switzerland.[14] The plaintiffs argued that the Swiss government's insufficient climate action violated their rights under the European Convention on Human Rights, particularly the right to life and the right to a healthy environment. The case emphasized the legal duty of states to protect vulnerable populations from the harmful effects of climate change. In its ruling, the ECtHR marks a significant milestone in recognizing climate change as a human rights issue. This growing linkage between climate change and human rights has been echoed in various other international legal proceedings and continues to influence how courts address state obligations in the context of global warming.

In the African context, the Ogoni case before the African Commission on Human and Peoples' Rights offers another important example of regional climate-related litigation.[15] In this case, the Commission addressed degradation caused by oil extraction activities in Nigeria, which led to significant harm to local communities. While the case focused on the violations of rights under the African Charter on Human and Peoples' Rights, it also highlighted the broader implications of fossil fuel development impacts for human rights, including the right to health. The African Commission's decision underscored the responsibility of States to prevent damage and protect their citizens from climate-related harm, contributing to the development of a legal framework that connects degradation due to fossil fuel exploitation to human rights obligations. It highlighted that "The right to a general satisfactory environment, as guaranteed under Article 24 of the African Charter or the right to a healthy environment, as it is widely known, therefore imposes clear obligations upon a government. It requires the state to take reasonable and other measures to prevent pollution and ecological degradation, to promote conservation, and to secure an ecologically sustainable development and use of natural resources."[16]

Climate change-related financial disputes are also heard in investment arbitration, as demonstrated by various cases heard under the International Centre for Settlement of Investment Disputes (ICSID) and UN Centre for Investment and Trade Law (UNCITRAL) rules, though scholars note it is at best

[14] Klimaseniorinnen v Switzerland (Application No 53600/20) (ECtHR) (2020) and Kanstantsin Dzehtsiarou, "KlimaSeniorinnen Revolution': The New Approach to Standing" (2024) 5 European Convention on Human Rights Law Review 423.

[15] Social and Economic Rights Action Center (SERAC) and Center for Economic and Social Rights (CESR) v Nigeria (2001) Communication No 155/96 African Commission on Human and Peoples' Rights, (2001) AHRLR 60 (ACHPR 2001) and Fons Coomans, "The Ogoni Case Before the African Commission on Human and Peoples' Rights" (2003) 52 International and Comparative Law Quarterly 749.

[16] Social and Economic Rights Action Center (SERAC) and Center for Economic and Social Rights (CESR) v Nigeria (2001) Communication No 155/96 African Commission on Human and Peoples' Rights, (2001) AHRLR 60 (ACHPR 2001) 52.

a double-edged sword for climate justice.[17] Disputes can arise when private investors challenge State actions intended to reduce dependence on fossil fuels or to undermine renewable energy commitments, claiming that such measures unfairly affect their investments. As an example of the former, in Vattenfall v. Germany, a Swedish energy company Vattenfall challenged Germany's decision not to grant a water permit for a coal-fired power plant. The investor argued that Germany's regulatory measures violated their rights under the Energy Charter Treaty. The case was ultimately settled but highlighted the tension between state regulation to reduce GHG emissions and the protection of investor rights, raising key questions about the balance between climate action and investor protection in international law.[18] An example of the latter is found in the Eiser Infrastructure Limited and Energía Solar Luxembourg S.A. v. Spain award, in which investors in the Spanish solar energy sector brought a claim against Spain for planned changes to its renewable energy subsidy regime.[19] The investors argued that Spain's modifications to the feed-in tariff scheme, posited to reduce the country's fiscal burden, amounted to expropriation and violated their rights under the Energy Charter Treaty, and the tribunal ruled in favour of investors who had relied on the rate commitment to finance renewable energy.

The Permanent Court of Arbitration (PCA) has also considered climate change-related issues in the PCA South China Sea, in which the Philippines brought a case against China regarding its construction of artificial islands in the South China Sea.[20] The arbitration focused on law of the sea, with significant

[17] Markus Gehring et al, 'Investment Treaties and SDG 13 Climate Action', in Marie-Claire Cordonier-Segger, Sean Stephenson and Ted Gleason (eds), Research Handbook on Investment Law and Sustainable Development (Edward Elgar 2025 forthcoming); Markus Gehring and Avidan Kent, 'Investment Law and the Environment: Evolving International Practice and Norms' in Erika Techera et al. (eds) Routledge Handbook of International Environmental Law (2nd edn Routledge 2020). See also United Nations Commission on International Trade Law, 'UNCITRAL Rules on Transparency in Treaty-Based Investor-State Arbitration' (UNCITRAL 2014).

[18] International Centre for the Settlement of Investment Disputes Vattenfall AB and others v. Federal Republic of Germany (2020) Case No. ARB/12/12 and Venetia Argyropoulou, "Vattenfall in the Aftermath of Achmea: Between a Rock and a Hard Place?" (2019) 4 European Investment Law and Arbitration Review 203.

[19] International Centre for the Settlement of Investment Disputes Eiser Infrastructure Limited and Energía Solar Luxembourg S.à r.l. v. Kingdom of Spain, ICSID Case No. ARB/13/36, see Muskaan Singh, 'The Incorporation of International Investment Protection Law in Renewable Energy Disputes: The Case of Spain' (2022) 2(5) Indian J Intg Res Law 34.

[20] The Tribunal found "with respect to the protection and preservation of the marine environment in the South China Sea: a. that China's land reclamation and construction of artificial islands, installations, and structures at Cuarteron Reef, Fiery Cross Reef, Gaven Reef (North), Johnson Reef, Hughes Reef, Subi Reef, and Mischief Reef has caused severe, irreparable harm to the coral reef ecosystem; b. that China has not cooperated or coordinated with the other States bordering the South China Sea concerning the protection and preservation of the marine environment concerning such activities; and

implications for climate change, as activities such construction of islands could affect marine ecosystems, including coral reefs, which are vital to climate resilience. The PCA's award emphasised the responsibility of States and its findings continue to influence international law, particularly in the context of ocean governance and climate change adaptation.

Together, these cases form part of a growing body of international legal precedent that is shaping the landscape of climate change law. While the recent advisory opinion on climate change from the ITLOS, and the opinions being drafted in the IACtHR and the ICJ are highly significant, they build on a rich and growing foundation of judicial engagement with disputes related to climate change, human rights, the environment and sustainable development. Claimants and tribunals are increasingly seeking independent, peaceful resolution to disputes on climate change. As the Klimaseniorinnen, African human rights cases, ICSID disputes and PCA case suggests, our understanding of State responsibility in the context of climate change is evolving. Potentially, as some scholars advocate, these developments could encourage and shape more robust and enforceable climate commitments, by clarifying the legal obligations of States and the rights of individuals and communities in the face of a global climate crisis.[21]

## 3. The Role of Advisory Opinions in International Climate Litigation

In recent years, stakeholders and states have moved forward to seek advisory opinions from influential international tribunals. Advisory opinions are non-binding legal opinions issued by international courts or tribunals at the request of authorized entities, such as United Nations bodies or other international organizations.[22] While these opinions do not resolve specific disputes between Parties, they can provide valuable legal guidance on complex issues of international law.

In the context of climate change, advisory opinions have been sought to clarify the legal obligations of States under international law, including on law of the sea, human rights, protection of the environment and sustainable development. These opinions have the potential to help interpret and shape the legal frameworks that govern State and others' policies and actions in relation to

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c. that China has failed to communicate an assessment of the potential effects of such activities on the marine environment, within the meaning of Article 206 of the Convention" The South China Sea Arbitration (The Republic of the Philippines v. The People's Republic of China) (2013-19) (2016) and Thomas J Schoenbaum, "The South China Sea Arbitration Decision: The Need for Clarification" (2016) 110 AJIL Unbound 290.

[21] Maria Antonia Tigre 'Climate Litigation in the Global South: Mapping Report', (Columbia Law School, Sabin Centre for Climate Change Law 2024) and Benoit Mayer and Harro van Asselt, 'The rise of international climate litigation', RECIEL 32(2) (2024) <https://onlinelibrary.wiley.com/doi/10.1111/reel.12515 >

[22] James Crawford and Ian Brownlie, Brownlie's Principles of Public International Law (OUP 2019); Malcolm N. Shaw, International Law (9th edn CUP 2021).

climate change. They could also fill gaps in international law, where treaties may be silent or ambiguous on specific climate-related issues, such as the duty to mitigate climate impacts, the protection of vulnerable communities, or the rights of future generations.

The ITLOS, IACtHR, and ICJ have been approached for advisory opinions on climate change matters, reflecting the growing recognition of their role in climate governance. These tribunals, with their distinct mandates, offer different but complementary perspectives on the legal dimensions of climate change.

## 4. Advisory Proceedings in ITLOS

The International Tribunal for the Law of the Sea (ITLOS) is an important international dispute settlement body with a specific focus on the law of the sea.[23] ITLOS was established under the United Nations Convention on the Law of the Sea (UNCLOS) to adjudicate disputes related to the use and conservation of the world's oceans.[24] Given the profound impacts of climate change on marine ecosystems—such as rising sea levels, ocean acidification, and the destruction of coral reefs—climate change-related legal issues are being raised to ITLOS.

The Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Request for Advisory Opinion submitted to the Tribunal) was requested on 12 December 2022. The request for an advisory opinion focused on the legal obligations of States under UNCLOS to prevent harm caused by climate change, particularly with regard to the protection of the marine environment and the rights of coastal states to maintain control over their maritime zones.

The questions asked were: "What are the specific obligations of State Parties to the Un ited Nations Convention on the Law of the Sea (the "UNCLOS"), including under Part XJI: (a) to prevent, reduce and control pollution of the marine environment in relation to the deleterious effects that result or are likely to result from climate change, including through ocean warming and sea level rise, and ocean acidification, which are caused by anthropogenic greenhouse gas emissions into the atmosphere? (b) to protect and preserve the marine environment in relation to climate change impacts, including ocean warming and sea level rise, and ocean acidification?"[25]

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[23] Yoshifumi Takana, The International Law of the Sea (4th edn CUP 2023), and Cassie Lumsden et al, 'Navigating High Seas Biodiversity and Climate Change', in Marie-Claire Cordonier Segger and Christina Voigt, Routledge Handbook of Climate Law and Governance: Courage, Contributions and Compliance (Taylor & Francis 2024).

[24] United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, Annex VI.

[25] Commission of Small Island States on Climate Change and International Law (Request for Advisory Opinion) ITLOS Case No 31 (12 December 2022) < https://www.itlos.org/en/cases/list-of-cases/request-for-advisory-opinion-31 > accessed 12 January 2025.

The Advisory Opinion issued by ITLOS provided a significant contribution to international climate law, providing a clear articulation of the legal obligations of States to protect the marine environment from the effects of climate change. The tribunal ruled that anthropogenic GHG emissions into the atmosphere constitute pollution of the marine environment and that through UNCLOS State Parties have specific obligations to cooperate, directly or through competent international organizations, continuously, meaningfully and in good faith, in order to prevent, reduce and control marine pollution from anthropogenic GHG emissions. State also have a specific obligation to assist developing States, in particular vulnerable developing States, in their efforts to address marine pollution from anthropogenic GHG emissions. The obligation to protect and preserve the marine environment constitutes a strict due diligence obligation, given the high risks of serious and irreversible harm to the marine environment from climate change impacts and ocean acidification.[26] It highlighted that law of the seas and the global climate regime are mutually supportive.

## 5. The Advisory Opinion of the Inter-American Court of Human Rights (IACtHR)

The Inter-American Court of Human Rights (IACtHR) has also been called to respond to climate change from a human rights perspective. In recent years, the Inter-American Commission on Human Rights received a petition from the Artic Athabaskan Council on behalf of the Athabaskan peoples, claiming that Canada's lack of action against regulating black carbon emissions will affect their rights related to the enjoyment of the benefits of their culture, to property, to the preservation of health, and to their own means of subsistence.[27] Then in January 2023, the Court was asked for an advisory opinion on the human rights implications of climate change, specifically focusing on the obligations of States with regards to climate change, including rights of children and future generations in the Americas. In particular, the IACtHR has been asked to consider the specific obligations under

[26] Ezio Costa Cordella et. al (eds), State Responsibilities in the Climate Crisis: Legal Standards and Global Litigation (Tirant lo Blanch 2024), Marie-Claire Cordonier Segger and Christina Voigt, Routledge Handbook of Climate Law and Governance: Courage, Contributions and Compliance (Taylor & Francis 2024) and Marie-Claire Cordonier Segger and Damilola Olawuyi, Sustainable Development Law: Principles, Practices and Prospects (2nd edn Oxford University Press forthcoming 2025).

[27] Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations of the Rights of Artic Athabaskan Peoples Resulting from Rapid Artic Warming and Melting Caused by Emissions of Black Carbon by Canada, (2013) https://judicialportal.informea.org/sites/default/files/court-case/AAC_PETITION_13-04-23a.pdf and Agnieszka Szpak, "Arctic Athabaskan Council's Petition to the Inter-American Commission on Human Rights and Climate Change—Business as Usual or a Breakthrough?" (2020) 162 Climatic Change 1575.

the Inter-American Convention on Human Rights.[28] The request for an advisory opinion seeks to clarify the relationship between climate change and human rights, particularly the right to life, health, and rights arising from the Escazu Agreement.[29]

The IACtHR's advisory opinion has the opportunity to be groundbreaking, affirming that the right to a healthy environment as part of the obligations of states in the climate crisis. The Court might find, for instance, that States have an obligation not only to prevent harm to the environment but also to ensure that climate change does not interfere with the enjoyment of fundamental human rights. It could emphasise that failure to take adequate climate action could lead to violations of the right to life, health, and the right to a clean, healthy and sustainable environment. Furthermore, the IACtHR's opinion could offer clear guidance on the obligations of States to protect vulnerable populations from the impacts of climate change. The Court might reaffirm that States must ensure the participation of affected communities in decision-making processes related to climate change, protect environmental defenders and provide communities with access to remedies in cases where their rights are violated. The advisory opinion holds potential for significant implications for human rights-based climate litigation, offering a strong legal framework for arguing that climate change-related harm constitutes a violation of human rights. It remains to be seen, at the time of publication, whether and how this opportunity is taken up by the Court.

## 6. Advisory Proceedings in the International Court of Justice (ICJ)

The International Court of Justice (ICJ) stands as the principal judicial body of the United Nations and plays a pivotal role in adjudicating disputes between states on matters of international law.[30] Given its mandate to provide legal opinions on contentious cases and advisory proceedings, the ICJ is uniquely positioned to influence the development of international law on climate change. Indeed, over recent decades, the ICJ has been called to address the rights of vulnerable populations, territorial sovereignty, sustainable development, transboundary

[28] See Request for an Advisory Opinion on the Climate Emergency and Human Rights, submitted by the Republic of Colombia and the Republic of Chile, IACtHR OC-1/23 (9 January 2023) https://corteidh.or.cr/docs/opiniones/soc_1_2023_en.pdf and American Convention on Human Rights (adopted 22 November 1969, entered into force 18 July 1978) 1144 UNTS 123.

[29] Request for an Advisory Opinion on the Climate Emergency and Human Rights, submitted by the Republic of Colombia and the Republic of Chile, IACtHR OC-1/23 (9 January 2023) https://corteidh.or.cr/docs/opiniones/soc_1_2023_en.pdf and Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (adopted 4 March 2018, entered into force 22 April 2021) UNTS Registration No 56055 ('Escazu Agreement').

[30] James Crawford, Brownlie's Principles of International Law (9th edn OUP 2019).

pollution, and the obligations of States under international conventions—matters that intersect directly with the legal challenges posed by climate change, and are highly relevant to climate justice.[31]

One of the most significant contributions of the ICJ to date is found in the 2010 case Pulp Mills on the River Uruguay (Argentina v. Uruguay). This case, which concerned plans for a pulp mill built on a shared river, dealt directly with sustainable development concerns, also the duty of States to integrate environmental concerns into development decision-making.[32] Some scholars also argue that the ICJ's ruling recognised the need to prevent transboundary harm, respect impact assessments, and take precaution into account.[33] It was also, however, argued that the mill would support local livelihoods and value-added development of paper products, reducing GHG emissions from long-distance transportation of wood to be refined into paper, and that certain actions should not be mandated as they would increase GHG emissions.[34] The case reinforced the concept that the potential for transboundary impacts on human health, community livelihoods and the Parties shared environment demands international cooperation and responsibility— crucial findings in the context of climate change.[35]

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[31] Marie-Claire Cordonier Segger and Judge CG Weeramantry, Sustainable Development Principles in the Decisions of International Courts and Tribunals: 1992-2012 (Routledge 2017) and Christina Voigt and Zen Makuch, Courts and the Environment (Edward Elgar Publishing).

[32] The ICJ noted that "Regarding Article 27, it is the view of the Court that it embodies the interconnectedness between equitable and reasonable utilization of a shared resource and the balance between economic development and environmental protection that is the essence of sustainable development." Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay) (Judgement) [2010] ICJ 1.20 164. See Marie-Claire Cordonier Segger and Damilola Olawuyi, Sustainable Development Law: Principles, Practices and Prospects (2nd edn Oxford University Press 2025 forthcoming); Marie-Claire Cordonier Segger and HE Judge CG Weeramantry, Sustainable Development Principles in the Decisions of International Courts and Tribunals: 1992-2012 (Routledge 2017).

[33] The ICJ did not ignore precaution entirely, noting, "[A] precautionary approach may be relevant in the interpretation and application of the provisions of the Statute." Pulp Mills on the River Uruguay (Argentina v. Uruguay) (Judgement) [2010] ICJ 1.20 164. Scholars suggest that, in a later decision, ITLOS saw this acknowledgment as an affirmation of the precautionary principle, Responsibilities and Obligations of States Sponsoring Persons and Entities with Res Activities in the Area (Advisory Opinion) ITLOS 135. See Cymie R. Payne, 'Environmental Impact Assessment as a Duty under International Law: The International Court of Justice Judgment on Pulp Mills on the River Uruguay', European Journal of Risk Regulation 1(3) (2010); Ling Chen, 'Realizing the Precautionary Principle in Due Diligence', Dalhousie Journal of Legal Studies 24 (2016) 14; Daniel Kazhdan, 'Precautionary Pulp: "Pulp Mills" and the Evolving Dispute between International Tribunals over the Reach of the Precautionary Principle' Ecology Law Quarterly 38(2) (2011).

[34] Ibid, supra n. 31.

[35] Ezio Costa Cordella et. al (eds), State Responsibilities in the Climate Crisis: Legal Standards and Global Litigation (Tirant lo Blanch 2024) and Marie-Claire Cordonier Segger and Judge CG Weeramantry, Sustainable Development Principles in the Decisions of

In the context of climate litigation, a deeply anticipated advisory opinion from the ICJ concerns Obligations of States in respect of Climate Change, which has been requested unanimously by the UN General Assembly after 111 UN states co-sponsored the resolution under the leadership of Vanuatu. As the "world's highest court",[36] scholars argue that the ICJ's legal guidance on the responsibility of States for their role in global climate change holds the prospects to be groundbreaking.[37]

Given the Court's authoritative position in international law, the ICJ is being asked to clarify several legal issues related to climate change. The question before the Court, as agreed in the United Nations, is based on a challenging compromise:

"(a) What are the obligations of States under international law to ensure the protection of the climate system and other parts of the environment from anthropogenic emissions of greenhouse gases for States and for present and future generations;

(b) What are the legal consequences under these obligations for States where they, by their acts and omissions, have caused significant harm to the climate system and other parts of the environment, with respect to:

(i) States, including, in particular, small island developing States, which due to their geographical circumstances and level of development, are injured or specially affected by or are particularly vulnerable to the adverse effects of climate change?

(ii) Peoples and individuals of the present and future generations affected by the adverse effects of climate change?"[38]

Indeed, with regards to State responsibility for climate change, the ICJ has the opportunity to interpret the obligations of States under the UNFCCC and the Paris Agreement, particularly in relation to their duties to prevent significant harm from climate change. States could be asked to demonstrate how they are meeting their obligations to reduce emissions, help vulnerable states, and take preventative actions against climate-related disasters. Further, in terms of the duty of States to protect human rights, the ICJ could provide advisory guidance is the relationship between foreclosure of sustainable development opportunities, harm to human life, health and the environment caused by climate change, and

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International Courts and Tribunals: 1992-2012 (Routledge 2017).

[36] Pacific Islands Students Fighting Climate Change, https://www.pisfcc.org/ Accessed 12 January 2025.

[37] Maria Antonia Tigre, 'It is (Finally) Time for an Advisory Opinion on Climate Change: Challenges and Opportunities on a Trio of Initiatives' Charleston Law Review, 17 (2023); Ian Fry, 'Providing Legal Options to Protect the Human Rights of Persons Displaced Across International Borders due to Climate Change: Report of the Special Rapporteur on the Promotion and Protection of Human Rights in the Context of Climate Change, Ian Fry', United Nations General Assembly, Human Rights Council 35th Session (2023).

[38] Obligations of States in Respect of Climate Change (Request for an advisory opinion) [2023] ICJ.

the violation of human rights. The ICJ might clarify whether the failure to address climate change constitutes a breach of fundamental human rights, including the right to life, the right to health, and the right to an adequate standard of living. In addition, with regards climate-induced displacement, climate refugees and the duty of States to protect populations displaced by the impacts of climate change, the ICJ might be able to interpret existing international treaties on refugees in the context of climate-induced displacement, which is expected to increase dramatically in the coming decades. Of key further importance, in terms of the obligations and responsibilities of industrialized countries which historically have been the largest contributors to greenhouse gas emissions and benefited most, economically, from their development and use in recent decades, the ICJ may address whether developed nations have a special duty to assist developing countries in adapting to climate change, pursuant to the "common but differentiated responsibilities" principle.

Given the ICJ's ability to provide authoritative legal opinions, in its historic Advisory Opinion on climate change, the Court has the opportunity to significantly influence the interpretation and enforcement of international law in relation to climate change, and to guide domestic, regional and related international legal developments on these challenges. The Court could provide clarity on the legal responsibilities of states to curb emissions, protect vulnerable populations, and support adaptation and resilience efforts globally. Moreover, a strong ICJ advisory opinion could offer a legal framework for States to adopt more ambitious climate action plans, shaping their nationally determined contributions (NDCs) to the global response to climate change under the Paris Agreement and beyond. The advisory opinion might reinforce the signal to global markets which were placed on notice, in the 28th Conference of the Parties to the UN Framework Convention on Climate Change in Dubai, UEA, that the world must transition "away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science."[39] The Court could, in its advisory opinion, reinforce the momentum towards sustainable development generated by agreement, in the 29th Conference of the Parties to the UN Framework Convention on Climate Change in Baku, Azerbaijan, on a New Collective Quantified Goal on Climate Finance (NCQG) of "at least USD 300 billion per year by 2035 for developing country Parties for climate action".[40] The opinion may also guide and shape future climate litigation, helping to align national policies with international legal obligations, to protect human rights to life, to health, and to a clean, healthy and sustainable

[39] Conference of the Parties to the Paris Agreement, 'Outcome of the first Global Stocktake' Decision CMA.5 https://unfccc.int/sites/default/files/resource/cma5_auv_4_gst.pdf?download [2023] para 28(d), (h).

[40] Conference of the Parties to the Paris Agreement, 'New Collective Quantified Goal on Climate Finance' Decision CMA.6 https://unfccc.int/sites/default/files/resource/CMA_11%28a%29_NCQG.pdf [2023], 8.

environment, to respect the rights and interests of future generations,[41] and to encourage States to take more proactive measures to mitigate and adapt to climate change impacts.

Further, and as noted in the International Union for Conservation of Nature (IUCN) submission to the ICJ, the climate advisory case represents a critical contribution to the evolving field of climate law, particularly in terms of reinforcing states' obligations to protect the global environment.[42] In particular, as IUCN highlighted, the Court might take account of the importance of the precautionary principle and the obligation of states to prevent harm to the environment, even in the face of scientific uncertainty regarding the full scope of climate impacts.[43] In doing so, as the IUCN emphasized, that States' failure to mitigate climate change could result in transboundary environmental harm, impacting not just the States directly involved but also the global community at large.[44] In addition, the UNFCCC, the Paris Agreement, UNCLOS (as per the ITLOS advisory opinion) and other international treaties do not merely offer aspirational targets but create legal obligations that bind States to take effective measures to limit greenhouse gas emissions.[45] In its advisory opinion the ICJ has the opportunity to affirm that the duty to protect the environment extends to the protection of shared natural resources, such as the atmosphere, and that failure to meet emission reduction targets constitutes a violation of international law. This emphasis on binding obligations is a key element in understanding how international law can be leveraged to hold states accountable for their contributions to climate change. As the IUCN submission also argued, the intersection of climate change and human rights law is crucial in this case. Drawing on the growing body of case law linking environmental protection with fundamental human rights, such as the right to life and the right to a clean, healthy and sustainable environment, as IUCN requests, the ICJ holds a key opportunity to recognize the link between climate change and its impacts on human rights.[46] By framing climate change as a human rights issue, the Court could strengthen the legal basis compelling States to take urgent action to protect vulnerable populations from the harmful effects of climate change. This would align with the broader movement in international law to incorporate human rights standards into climate governance, as part of a commitment to sustainable development, ensuring that the most affected communities are given a voice in climate negotiations and actions.[47]

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[41] Marie-Claire Cordonier Segger, Marcel Szabó and Alexandra R Harrington, Intergenerational Justice in Sustainable Development Treaty Implementation (Cambridge University Press 2021).

[42] Obligations of States in Respect of Climate Change (Written Statement of the International Union for Conservation of Nature) ICJ [2024].

[43] Ibid.

[44] Ibid.

[45] Ibid.

[46] Ibid.

[47] Marie-Claire Cordonier Segger and Christina Voigt (eds), Routledge Handbook of Climate

Finally, as the IUCN highlighted, the Advisory Opinion offers an important opportunity for the ICJ to recognise the principle of intergenerational equity in the context of climate change. As IUCN, expert scholars, the judiciary and others have recommended,[48] in its Advisory Opinion the ICJ could consider the rights of future generations, framing climate change as a cross-generational issue that requires States to act not only in the present but also for the protection of nature and sustainable development for future generations. By invoking this principle, climate change mitigation is positioned as a urgent moral and legal responsibility that transcends national boundaries and time. In essence, the ICJ has been offered a historic opportunity to pave the way for more binding international legal actions, bolstering global climate governance efforts and inspiring states to meet their climate commitments. It remains to be seen, at the time of publication, if this opportunity can be realised.

## 7. Comparative Analysis: ITLOS, IACtHR, and ICJ Advisory Proceedings

While the ITLOS, IACtHR, and ICJ are governed by distinct mandates, their advisory opinions have the opportunity to provide coherent international legal guidance, particularly in terms of State responsibility in responding to the global challenge of climate change. Each tribunal's approach to climate litigation might bring a unique perspective to the table, while collectively highlighting the growing contributions of international law to common concerns such as respect for human rights, the protection of nature, and the need for more sustainable development, worldwide.

The ITLOS, with its focus on the law of the sea, addresses the legal issues related to ocean governance and the impacts of climate change on marine environments. The IACtHR, meanwhile, is uniquely concerned with the protection of human rights, particularly the rights of vulnerable populations affected by climate change across the Americas. The ICJ, as the main judicial body of the UN, has the opportunity to clarify the obligations of all states with regards to climate change.[49] Despite these differing mandates, all three international courts

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Law and Governance: Courage, Contributions and Compliance (Taylor & Francis 2024); Marie-Claire Cordonier Segger and Damilola Olawuyi, Sustainable Development Law: Principles, Practices and Prospects (2nd edn Oxford University Press 2025 forthcoming).

[48] Marie-Claire Cordonier Segger, Marcel Szabó and Alexandra R. Harrington (eds), Intergenerational Justice in Sustainable Development Treaty Implementation: Advancing Future Generations Rights through National Institutions (CUP 2021), Christina Voigt (ed), International Judicial Practice on the Environment: Questions of Legitimacy, (CUP 2019) and Sumudu Atapattu, UN Human Rights Institutions and the Environment, (Taylor & Francis 2023).

[49] Tejas Rao, Marie-Claire Cordonier Segger and Markus Gehring, "'The Advisory Opinion Could Reshape Global Climate Governance" [2024] Verfassungsblog.

and tribunals can emphasise the importance of international cooperation, the responsibility of states to prevent harm, and the protection of human rights. Further, the ITLOS, IACtHR, and ICJ have different jurisdictional boundaries and procedural rules. ITLOS focuses specifically on issues related to the law of the sea and maritime disputes. In contrast, the IACtHR handles cases related to human rights violations within the Americas, and its advisory opinions are especially relevant for climate-related human rights concerns. The ICJ, as the principal judicial organ of the UN, has jurisdiction over a wide range of international disputes, including those related to environmental law, state responsibility, and treaty law. Despite these differences, these key international tribunals are increasingly engaging with climate change issues, and their opinions have the opportunity to shape the development of climate law and governance climate worldwide.

Indeed, while advisory opinions are legally binding only on the requesting institution, they carry significant weight in international law and can influence the legal norms governing climate change. The advisory opinions issued by these tribunals have the potential to establish new legal understanding, guiding States in the implementation of climate commitments, framing future climate litigation, and reinforcing the contributions of climate law and governance to rule of law and peaceful settlement of disputes. For instance, ITLOS' advisory opinion on marine environmental protection provides important guidance for ocean governance in the context of climate change. Similarly, depending on their findings, the IACtHR's opinion the human rights obligations with regards to climate change may be referenced for decades, shaping in legal cases across the Americas. Indeed, as international climate litigation continues to evolve, it is likely that the advisory opinions of these tribunals will form a key part of the legal landscape. States may increasingly turn to these courts for guidance on how to fulfil their obligations under international law, particularly as the climate crisis intensifies and its impacts become more widespread. These advisory opinions could also play a critical role in fostering international cooperation, strengthening the international climate regime and ensuring that States fulfil their obligations to promote more sustainable development, protect nature and respect human rights in the face of climate change.

## 8. Conclusion

The recent advisory proceedings in ITLOS, IACtHR, and ICJ represent a significant development in the field of international climate litigation. These tribunals are helping to shape the legal framework for addressing the global climate crisis, providing critical legal guidance on state obligations, human rights, and climate protection. As the world confronts increasingly severe climate impacts, the role of international courts in guiding global climate governance will become even more crucial.

Through their advisory opinions, ITLOS, IACtHR, and ICJ have the opportunity to make important contributions to climate law and governance, worldwide. While these opinions are non-binding, their influence is undeniable, as they clarify State responsibilities and help create a legal framework that can address the complex and interconnected challenges of climate change. Indeed, the rule of law and peaceful settlement of disputes may depend, in the end, on the courage of Courts such as these, whose opinions can provide necessary legal clarity and direction for States as they navigate the complex terrain of climate action and justice.

The need for strong, coordinated international climate action in the context of sustainable development is clear. The advisory opinions of ITLOS, IACtHR, and ICJ have a historic opportunity to shape our understanding of the duties of States and stakeholders advancing this action, offering legal guidance that can strengthen international commitments and ensure the protection of human rights, the climate system and the rights of future generations to address this common concern of humankind.

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# The bumpy road to climate neutrality and just transition and the case of Greece

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## Abstract

This paper aims to present the state-of-the art of the Greek climate mitigation policy, map it in the context of the international and European legal and political framework and highlight the challenges ahead to achieve just transition and climate neutrality by 2050. It argues that in a world of increasing polarization and competition, the road to achieve these goals is not covered with roses. It will be smoother if it is combined with transformative and coordinated policies as well as strong societal support. Relevant stakeholders need to be effectively engaged in this process not simply through formal consultation processes but through an open and constructive social dialogue that will enable them to co-design sustainable solutions.

**Keywords:** Climate neutrality, just transition, European Green Deal, Greek national energy and climate plan, Greek national climate law

# Ο κακοτράχαλος δρόμος προς την κλιματική ουδετερότητα και τη δίκαιη μετάβαση και η περίπτωση της Ελλάδας

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## Περίληψη

Το άρθρο αυτό στόχο έχει να παρουσιάσει την Ελληνική πολιτική για την αντιμετώπιση της κλιματικής αλλαγής, να τη χαρτογραφήσει στο διεθνές και Ευρωπαϊκό νομικό και πολιτικό πλαίσιο, καθώς και να αναδείξει τις προκλήσεις ως προς την επίτευξη των στόχων της δίκαιης μετάβασης και της κλιματικής ουδετερότητας έως το 2050. Υποστηρίζει ότι σε ένα κόσμο αυξανόμενης πόλωσης και ανταγωνισμού, η επίτευξη των κλιματικών στόχων δεν θα είναι εύκολη υπόθεση. Θα πετύχει μόνον αν συνδυαστεί με μεταρρυθμιστικές και συντονισμένες πολιτικές καθώς και υψηλό επίπεδο κοινωνικής στήριξης. Οι εμπλεκόμενοι φορείς θα πρέπει να συμμετέχουν σε αυτή τη διαδικασία όχι μόνο μέσω της τυπικής διαδικασίας διαβούλευσης αλλά μέσα από ένα ανοιχτό και εποικοδομητικό διάλογο που θα τους επιτρέπει να συν-διαμορφώνουν βιώσιμες λύσεις.

**Λέξεις κλειδιά:** Κλιματική ουδετερότητα, δίκαιη μετάβαση, Ευρωπαϊκή Πράσινη Συμφωνία, Εθνικό Σχέδιο για την Ενέργεια και το Κλίμα, Εθνικός Κλιματικός Νόμος

## 1. Introduction

Although Greece isn't historically a big contributor to the global warming, it is a country highly vulnerable to its impacts. Extreme weather events, wildfires, and floods, as well as slower environmental degradation, including sea level rise, droughts, and loss of biodiversity, continue to spread and intensify across the region. The Mediterranean is a climate change hotspot (Chandler, 2021) and it will be significantly drier in coming decades. It is a question of geography; being a big sea enclosed by continents impacts the pattern of air flow high in the atmosphere, creating a dry zone and warming up the land faster (Tuel & Eltahir, 2020, 14). Thus, intense heatwaves and devastating wildfires such as the ones we have witnessed during the last years, will be more frequent and intense in the future. The world's leading scientific authority on climate change, the Intergovernmental Panel on Climate Change (IPCC), warned that although major climate changes are unavoidable and irreversible, rapid, and drastic reductions in greenhouse gas emissions this decade can prevent further deterioration of our climate[1].

The European Union (EU) has committed to this direction and decided to further limit its emissions to 55% below 1990 levels by 2030 and to channel at least 30% of the global total expenditure of the Multiannual Financial Framework (MFF) and the Next Generation EU towards climate action. In December 2019, the EU launched an ambitious plan, the European Green Deal, which is the road map for sustainability in Europe, with the goal of making the continent climate neutral by 2050, that is zeroing its net greenhouse gas emissions[2]. This goal will be achieved by modernizing the economy through green technology, sustainable industry and transport while making the transition just and inclusive for all. A European Climate Law transformed the political target of climate neutrality into a legal obligation and regulated the next steps for the transition[3]. Moreover, an updated EU strategy on adaptation to climate change set out pathways to prepare for the inevitable impacts of climate change[4].

In line with those imperatives, Greece has taken further action to implement the coal (lignite) phase-out process, announced at the 2019 UN Climate Summit, few months before the launch of the European Green Deal. A Master Plan for

[1] IPCC (2021) Climate Change 2021. The Physical Science Basis. Summary for Policy Makers, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf (accessed on 16/12/2024).

[2] Climate neutrality refers to the idea of achieving net zero greenhouse gas emissions by balancing those emissions, so they are equal to, or less than, the emissions removed. This can be achieved by carbon sequestration, i.e. by removing carbon from the atmosphere or through offsetting measures which involve supporting climate-oriented projects.

[3] Regulation establishing the framework for achieving climate neutrality and amending regulations (EC) n. 401/2009 and (EU) 2018/1991 (European Climate Law), June 2021.

[4] Forging a climate-resilient Europe – The new EU strategy on Adaptation to Climate Change, 24 February 202.

a Just Development Transition[5] providing for a set of emblematic investments for the post-lignite era has been elaborated. The Greek National Recovery and Resilience Plan[6] has made the green transition a top priority, and in May 2022 a National Climate Law was adopted. Furthermore, the updated version of the National Energy and Climate Plan sets ambitious new targets to cut emissions of greenhouse gases (58% by 2030, 80% by 2040, and complete neutrality by 2050 while ensuring full energy independence) and expand the use of renewable energy sources. But are these actions enough to meet the 2030 targets and achieve climate neutrality by 2050 while at the same time ensuring a just transition where no one will be left behind? Do they ensure public support, especially from the people, businesses and the regions directly affected and/or involved?

This paper aims to present the state-of-the art of the Greek climate mitigation policy developed so far[7], map it in the context of the international and European legal and policy framework and highlight the challenges ahead to achieve just transition and climate neutrality by 2050. It is constructed in three parts. The first part draws the bigger picture and the policy challenges which shaped international responses and national commitments to mitigate climate change. The second part discusses the European Green Deal, its main characteristics, as well as its limitations. The third part delves into the Greek responses, mainly the ongoing decarbonization process and the just transition plan to explore their impact on the regions involved. It argues that the road to climate neutrality and just transition is not covered with roses. It will be smoother if it is combined with transformative and coordinated policies. Relevant stakeholders need to be effectively engaged in this process not simply through formal consultation processes but through an open and constructive social dialogue that will enable them to co-design sustainable solutions. The paper concludes with some general remarks on the challenges ahead.

## 2. The international framework: From top-down to bottom-up approaches

Climate change is not a local or even regional but a global problem. However, its mitigation and effective management requires the cooperation of states with very different -and often contradicting- interests, priorities, capacities, levels of development, let alone greenhouse gas emissions profiles (Bodansky et al., 2017, 13). At the same time, the protection against climate change is linked to a global public good. The most difficult challenge in dealing with global public goods is how to ensure the participation of everyone in the effort, especially those who are most responsible for causing the problem and avoid free riding. In other words, it requires a common pace and a high degree of global coordination.

[5] Just Transition Development Plan of lignite areas, September 2020.
[6] Greece 2.0. National Recovery and Resilience Plan, May 2021.
[7] Although crucial to address climate change impacts, the climate change adaptation policy will not be discussed in this paper.

Yet, long delays have hindered the progress of international cooperation (see Table 1), even though the first international agreement tackling climate change -the 1992 UN Framework Convention on Climate Change[8] (UNFCCC)- has been widely accepted and signed by almost every country in the world: 197 States and the EU. This Convention recognized the importance of the problem and its connection to human activities; it further acknowledged the need for action to minimize climate change and mitigate its impacts but left the details of implementation to be settled later through negotiations within the framework of a mechanism created by the same convention, the so-called COPs, or Conference of the Parties to be convened every year. It also recognized that different contributions to climate change result in different economic responsibilities between developed and developing countries – the so-called principle of common but differentiated responsibilities which allowed for different standards.

For a long time, negotiations focused on lobbying over long-term targets to reduce emissions in developed countries. Negotiating over national targets proved so difficult that the attempt was abandoned after COP15 in Copenhagen (2009)[9].

Table 1: Evolution of the international climate change framework: from top-down to bottom-up approaches

| UNFCCC 1992 | Kyoto Protocol 1997 | Paris Agreement 2015 |
|---|---|---|
| • The contracting parties committed to achieve "*stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*" | • The contracting **developed** countries committed to reduce their emissions. | • Both **developed and developing countries** committed to draft **national plans** to mitigate climate change and adapt to its impacts |
| • They didn't agree what sort of measures or timeframes. Step-by-step approach. | • Quantitative goals and timeframes | • Monitoring |
| • Establishment of the Conference of the Parties - **COP** - to meet every year. | • Monitoring and compliance mechanisms | • Regular updating |
| | • Sanctions in case of non-compliance | • Obligation of non regression |
| | | • Procedural obligations |

Source: Doussis (2024)

A very important step was taken in 2015, after repeated alarming appeals from the scientific community and both exhausting and exhaustive negotiations. Some common understanding was found and was reflected in the Paris Climate

[8] The United Nations Framework Convention on Climate Change was signed in 1992 and entered into force on 21 March 1994.

[9] For an interesting discussion on the failure to negotiate national mitigation targets at the international level see S. Sharpe (2023), p. 187.

Agreement[10] which complements the UNFCCC. This Agreement modified the original idea of setting targets at the international level and called on the states themselves to draft national plans for mitigation (Nationally Determined Contributions NDCs) and adaptation to the effects of climate change in order to address the impacts that cannot be avoided; and then communicate them in a manner that facilitates clarity, transparency and understanding. Additionally, with the Paris Agreement, states should review these policies regularly, under international supervision (see Table 2). In a nutshell, this is the institutional foundation of the Agreement, which puts all states on a common path to the gradual decoupling of national economies from fossil fuels. The long-term goal of the agreement being to limit the global temperature increase in this century to well below 2 degrees Celsius above preindustrial levels, while pursuing efforts to limit the increase to 1,5 degrees. To achieve this goal, parties should take measures to achieve climate neutrality, that is "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gas emissions" according to the wording of the Agreement, in the second half of the century.

In other words, the Paris Agreement does not require specific cuts to greenhouse gas emissions as did the 1997 Kyoto Protocol, which was the first complementary to the UNFCCC agreement. Instead, it creates a system that requires all parties to come up with their own responses, then monitor their progress and continue ramping efforts. The idea behind this system is that states get to choose their level of ambition and the means of its achievement, in other words how they will achieve the self-determined targets. Others will do it with regulations, others by imposing a carbon tax, other by using the emissions trading system or a combination of these. There are two conditions, however, set by the agreement: the first is regular updating (at least every five years) and the second is an obligation of non-regression (they cannot go back). The Agreement provides a dynamic mechanism to take stock and strengthen the ambition over time.

[10] The Agreement was adopted on 12 December 2015 and entered into force on 4 November 2016.

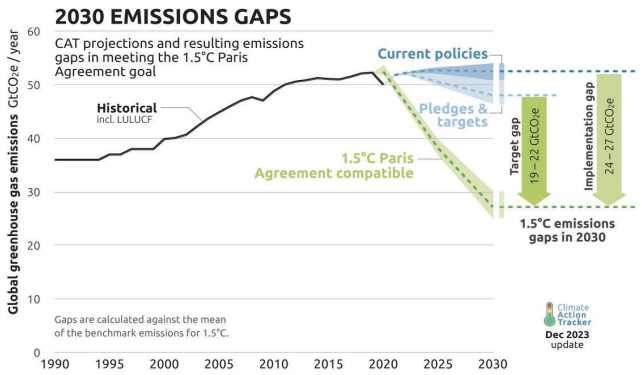
## Table 2: the 2015 Paris Climate Agreement key provisions

- *Long-term temperature goal* (art. 2): to limit the increase in global average temperature to 2°C as compared with pre-industrial times and pursue efforts to limit the temperature increase to 1,5°C.
- *Global peaking and climate neutrality* (art. 4): To achieve this temperature goal parties should peak GHG emissions as soon as possible and then go down to undertake rapid reductions. Peaking will take longer for developing countries.
- *Mitigation* (art. 4): each party shall prepare, communicate and maintain a nationally determined contribution (NDC) and pursue domestic measures to achieve them. Parties shall communicate their NDCs every 5 years and provide information for clarity and transparency. Each successive NDC will represent a progression to the previous one and reflect the highest possible ambition.
- Parties will meet every five years to evaluate progress in emissions reductions, adaptation and support.
- *Adaptation* (art. 7): Parties will shape National Adaptation Plans to climate change.
- *Finance, technology and capacity-building su*pport (art. 9, 10 & 11)

Source: Doussis (2024)

Where do we stand today, ten years after the adoption of this landmark agreement? Climate change has become an issue of major public concern and governments seem to be more committed nowadays. However, the national commitments (NDCs) that states have submitted so far to the UN are not enough to avoid crossing over dangerous temperature thresholds (see Table 3).

## Table 3: the world is not on track for a 1,5 C – aligned future




Source: Climate Action Tracker (2023)

In the COP 28, which took place in Dubai in 2023, one of the issues discussed was the global stocktake report. The global stocktake is a process for countries and stakeholders to see where they're collectively making progress towards meeting the goals of the Paris Agreement and where they're not. This report confirmed that we are not on track to limit global warming to 1,5 degrees Celsius. The window for meaningful change is closing and, thus, COP 28 was expected to achieve important decisions, concerning the fate of fossil fuels which is the main cause of the problem. Countries agreed to "transition away" from fossil fuels in a just, orderly and equitable manner to achieve net zero emissions by 2050 in keeping with the science[11]. They also agreed to triple renewable energy capacity and double energy efficiency by 2030. These targets remain in force. However, COP 28 failed to include a robust commitment to the phasing out of fossil fuels which is essential to limit global warming.

The COP 29, which concluded its work on 24 November 2024 in Baku, Azerbaijan (a country that produces and exports fossil fuels, as well as being the host country of the 2023 conference), had the main objective of reaching an economic agreement on the transition to clean energy and addressing the climate-related disasters in poorer countries that are most affected and least equipped to respond. An agreement was reached, but it falls short of expectations. Annual funding of $300 billion per year will be provided to developing countries by 2035, but trillions are needed. Global climate cooperation under the auspices of the United Nations, while important for maintaining a channel of communication, is neither a panacea nor a provider of substantial solutions for managing climate change.

Meanwhile, the upcoming assumption of the U.S. presidency by the most well-known climate change denier is not good news. Certainly, the circumstances are not the same as in 2016, when the same president withdrew U.S.A, the world's second-largest emitter, from the Paris Agreement. At that time, the biggest challenge was to convince the largest polluter, China, to make commitments to reduce harmful emissions. Today, while China still relies on coal as its primary energy source, it has invested heavily in expanding renewable energy, aspiring to become climate neutral by 2060 while maintaining high exports of materials essential for clean energy. Therefore, it also has an economic reason to support the green transition. India, which has risen to third place on the list of global polluters, is also heavily investing in renewables, has set ambitious targets for 2030 and leads global initiatives, such as the International Solar Alliance, to accelerate the deployment of solar energy technologies that will improve energy access and ensure energy security in participating countries.

Therefore, moving from Baku, three main challenges arise. The first is to persuade laggards to update their NDCs to be more ambitious than the previous versions to narrow the global emissions gap to a level compatible with the 1,5 degrees trajectory. The second priority is to ensure alignment of all financial flows with the goals of the Paris Agreement. The third challenge would be to accelerate

[11] Decision CMA.5, Outcome of the first global stocktake, 13 December 2023.

implementation of what has been agreed, including national climate plans for both mitigation and adaptation. It is equally important to strengthen the links between climate change and other agendas, including biodiversity and trade. Global governance in these areas should adapt with the Paris Climate Agreement temperature goal.

## 3. The European Green Deal: policy realities and political dilemmas

The European Union, which ranks fourth on the list of global polluters, has already achieved a substantial reduction in greenhouse gas emissions during the last decade, mainly due to a good performance of the commitments under the Kyoto protocol. It has further committed to limit its emissions at least 55% below 1990 levels by the end of the current decade (instead of by 40% which was the previous commitment). The European Green Deal is the EU's response to the implementation of the Paris Climate Agreement and the global call for robust measures, while transforming the European economy into climate neutral with no net greenhouse gas emissions in 2050.

The European Green Deal has multiple readings. The first one has an environmental dimension: it is a plan that attempts to protect, conserve, and enhance the climate and the EU's natural capital, while protecting the health and well-being of citizens from environmental related risks.

The second reading has an economic and a social connotation. The Green Deal aims to create a sustainable economic model, which at the same time strengthens the EU's energy autonomy. How will it be implemented? By giving a boost to green technology and development through a series of structural reforms ranging from the decarbonization of the energy sector and the promotion of green transport, to a circular economy and a new agreement on agriculture, among others. It is the beginning of a long journey that will take many years and all the reforms for the transformation of the economy should be done in a just way, especially for those who will be most affected, that is the workers and the local communities that have been trapped in polluting economic activities for decades and now should shift towards sustainable alternatives. To that end, a European Just Transition Mechanism has been set up to fund part of this effort and support EU regions most affected by the transition to a neutral carbon economy.

The European Green Deal has also a third reading, with an international dimension. If Europe becomes climate neutral by 2050, this is certainly not enough to save the planet since EU's emissions represent currently less than 10% of the world global greenhouse gas emissions. Giving the example, however, may lead other countries to follow in the same path[12]. Thus, the biggest challenge in this

[12] For an interesting overview concerning EU's leadership in climate change action see Parker, C.F., Karlsson, C., Hjerpe, M. (2017) "Assessing the European Union's Global Climate Change Leadership: From Copenhagen to the Paris Agreement", 39 Journal of European

context for the EU is to persuade other countries to follow suit, to create a large coalition for the transition to climate neutrality. The EU may facilitate this process by sharing best practices and by mobilizing its partnerships networks as well as its diplomatic capacity. It has done something similar before the Paris Agreement with positive results[13].

Despite the heightened politicization of the green transition ahead of the 2024 European elections, the European Union, remained committed to achieving the European Green Deal goal of achieving climate neutrality by 2050 (Bocquillon 2024). The 'Fit for 55 package' aiming to revise climate and energy legislation in a way that supports the objective of -55% reductions in EU greenhouse gas emissions by 2030 (an intermediate step towards the ultimate goal of climate neutrality by 2050), was originally composed of 13 legislative proposals, which were extended to 19. Until the 2024 European elections 18 out of the 19 proposals had been adopted[14] by the institutions. This legislation combines the strengthening of existing climate policies (application of the EU's emissions trading system to new sectors, increased use of renewable sources and greater energy efficiency) with new ones, such as a faster roll-out of low-emissions transport modes, measures to prevent carbon leakage (Carbon Border Adjustment Mechanism) and tools to preserve and grow natural carbon sinks. Moreover, a new Social Climate Fund has been created to support vulnerable households in energy or transport poverty, small companies and other vulnerable groups, meet the social and economic costs of the climate and energy transition. The Social Climate Fund will be mostly supplied by revenues from the new emissions trading system. The only proposal that hasn't been adopted yet concerns the revision of the Energy Taxation Directive to align energy taxation with the new EU's climate goal.

Having adopted most of the necessary legislation, attention now turns to implementation which requires Member States' cooperation to achieve the collective European goal. Implementation is far from easy given the great turmoil affecting Europe. It will only succeed if the net-zero carbon emission target is combined with Europe's economic transformation.

Therefore, two main concerns arise regarding the implementation of the European Green Deal. On the one hand, given the varied economic contexts of the Member States, any one-size-fits-all approach should be treated with caution. A balance should be found between the EU sustainable policies with the specific Member States needs and capacities. On the other hand, Member States should not use the European Green Deal as a top-down affair and blame the EU for national responsibilities. Member States should come up with their own decisions for tailor-made measures on how to achieve a common European climate goal.

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Integration, 2.

[13] For further analysis see S. Oberthür, L. Groen "Explaining Goal Achievement in International Negotiations: The EU and the Paris Agreement on Climate Change", 25 Journal of European Public Policy, 2018, p. 5.

[14] For details see the Legislative Train Schedule for 'Fit for 55', https://www.europarl.europa.eu/legislative-train/package-fit-for-55 (accessed on 3/1/2025).

## 4. The decarbonization process in Greece: from laggard to leader?

Being a country directly affected by the impacts of climate change, Greece has every interest in advocating for robust measures and in supporting international and regional initiatives. Nowadays it is expected to align its development process with the imperatives of the European Green Deal, the new midterm and long-term climate targets, and implement the 'Fit for 55' legislation. But how does a country, considered so far as a 'laggard' in environmental policies (Sbragia 1996, Pridham 1996, Borzel 2005, Doussis 2011, Plimakis 2018, Gouglas 2024) get prepared to implement the transition to climate neutrality at a time when it is struggling to recover its economy from significant challenges, including the debt crisis, the bailout programmes and the COVID-19 pandemic?

Some of the key elements of this transition are:

- the strategic planning that will go beyond the limits of an electoral cycle;
- the bold financial support of the plan;
- the support of relevant stakeholders and society in general.

Significant steps have already been taken and a policy to deal with the climate crisis has gradually begun to take shape. According to the latest data provided to the UN[15], by 2022, Greece had reduced its greenhouse gas emissions by 24,69 below the 1990 levels. According to the sixth biannual report, submitted to the UN in December 2024, if emissions/removals from LULUCF[16] were to be included, then the decrease would be 28,31%[17]. Approximately half of the emissions derived from energy industries, while the contribution of transport, manufacturing industries, and construction has been also significant. Fossil fuels still dominate the energy sector, although renewables now contribute 41,8% to electricity production[18]. Emissions from agriculture that account for 10,19% of total emissions decreased approximately 24,25% compared to 1990 levels, mainly due to the reduction of N2O emissions from agricultural soils, because of the reduction in the use of synthetic nitrogen fertilizers and the increase of organic farming. Emissions from the waste sector, which account for 7,97% of the total emissions) increased by approximately 15,91% compared to 1990 levels, because of the increase of generated waste associated with living standards improvement.

### The lignite phase-out process

The significant reduction of total greenhouse gas emissions in Greece is largely associated with the gradual withdrawal of lignite plans. Lignite was chosen

[15] Sixth Biennial Report under the UNFCCC (December 2024), available at https://unfccc.int/documents/645147 (accessed on 4/1/2025).
[16] LULUCF: Land Use, Land-Use Change and Forestry.
[17] Ibid, p. 3.
[18] Ibid, p. 2.

as the national energy source in the early 50s and has supported greatly the development of the economy and the electrification of the country for over seventy years (Vlassopoulos 2020)[19].

The decision to reduce the share of lignite in power generation and put a complete end to the operation of the lignite units and mines by 2028 -far earlier than other EU lignite producer countries[20]- was announced by the Greek Prime Minister in 2019. This landmark decision of rapid delignification has been further elaborated in the 2019 National Energy and Climate Plan, updated in 2024 which sets out priorities and policy measures to be attained by 2030. Among others, the new version of the Plan projects renewable electricity generation to reach 82% in 2030 in gross electricity consumption, with solar power becoming the main source of renewable electricity, and the share of wind power (including offshore windfarms) and installed capacity projected to double in 2030 compared to 2023. On decarbonization, the Plan outlines the importance of carbon removal technologies such as carbon capture and storage, while on the internal energy market the plan put forward major steps for interconnection. The plan sets higher objectives for improving energy efficiency for higher energy savings.

The rapid delignification is of great importance for improving the country's climate performance, especially considering that in the period between 1990-2017 lignite was responsible for 34% of greenhouse gas emissions coming from all sectors of the Greek economy combined[21]. It arose from the need to harmonize Greece's national energy and climate policy with the EU targets but also for economic reasons. Lignite mining and incineration was no longer profitable, following the revision of European ETS legislation which led to carbon emission allowance prices skyrocketing and subsidies being abolished. In fact, from January 2016 until June 2019 the Public Power Corporation (PPC) has accumulated net losses of 683 million euros just from the operation of its lignite units.

However, at the same time, this decision created a new status quo and significant challenges for the lignite-dependent regions, i.e. Western Macedonia (Ptolemais, Amyntaio and Florina) and the Peloponnese (Megalopolis), whose economies have revolved around lignite extraction for many decades. These areas are already facing problems, including long-term unemployment, poverty, lack of employment opportunities and skills' development (Doussis & Mantzaris, 2020). Further, they face issues of pollution and the restitution of mines and their surrounding environment after the closure of lignite plants. These problems take on a new dimension during the pandemic and the economic crisis that followed, the second serious economic crisis that the country has faced in recent

[19] For an historical overview of the evolution of the Greek energy sector see Vlassopoulos (2020).

[20] Currently, Germany, Poland and the Czech Republic are the main EU lignite producers. According to the German coal phase-out law, the use of coal to produce electricity will have to phase-out by 2038, while the early closure of lignite-fired power plants will be encouraged. The Czech Republic will also phase-out by 2038, while Poland committed to end coal production by 2049.

[21] This percentage was the third highest in the EU after Bulgaria and Poland.

years. Given the very short timeframe set by the Government for decarbonization, achieving the goal of a just transition becomes even more challenging to mitigate the effects for the regions involved.

**Just transition: definition and examples**

Just transition means restoring the jobs that will be lost through the elimination of polluting economic activities, while ensuring the long-term environmental and economic development of and for those areas that had based their economic survival in the former activities for decades, including mining and burning lignite[22]. In a nutshell, this is the mainstream conceptual core of just transition. The role of the state is crucial in all stages of the just transition process. State authorities should activate social dialogue with stakeholders and local communities; regulate the rules of climate, energy, and labor policy; and invest in infrastructure and social welfare, education and research and technology. In other words, to bring together the launch of appropriate measures to ensure a just outcome for those most affected.

How is a just transition achieved in practice? Just transition plans have been developed and implemented in several countries that had begun carbon phasing out at earlier points in time, for reasons not linked to climate change. In Germany, for example, North Rhine-Westphalia, an area dependent on carbon for many decades, has been transformed into a region that is now active and even pioneering in various fields such as biomedicine, environmental technology, research and education, and tourism, with an emphasis on industrial tourism. The Zollverein mine in Hesse was inscribed on the UNESCO World Heritage List in 2001 and has since become one of the most important industrial heritage sites in Europe. Central to this endeavour was strategic planning that went beyond the limits of an electoral cycle and provided generous financial support, and long-lasting policy measures. From 2007 to 2018, 17 billion euros were spent on voluntary retirement programs for older workers, training, and orientation programs for younger ones in order to move to other activities, as well as on the restoration of the environment and the renovation of industrial facilities. Most importantly, an extensive and systematic social dialogue with the participation of all stakeholders preceded any action.

Another example of a successful just transition approach is Denmark. The transition from coal to clean energy, mainly wind energy, began in the 1970s (Smith, 2017). Since then, Denmark has become an energy exporter, developing an internationally competitive wind industry (which includes companies such as Vestas -the world's second-largest wind turbine manufacturer- and the mostly state-owned Dong Energy, which undertakes renewable energy sources installation plans). Today, the wind industry in Denmark employs over 33.000 people. The active involvement of the stakeholders from the earliest stages of the transition was crucial. The role of the workers' unions was decisive as they had great

[22] For further analysis see B. Galgocs, Just Transition towards Environmentally Sustainable Economies and Societies for All, Policy brief, International Labour Organization, 2018.

influence over shaping public opinion and, consequently, political, and social consensus. It should, of course, be noted that trade unions in Denmark have been pro-environmental from the outset and have supported the renewable energy sources industry as they considered green jobs as the greatest opportunity to boost employment. The unions even launched a green think tank as a lever of pressure on the government for more ambitious energy and climate goals, which also acts as regular commentator on new proposals and initiatives in the field of addressing climate change and its impact on employment.

**The Just Transition Development Master Plan and its impact on local society**

Of course, Greece is not Germany or Denmark. Each country has its own special characteristics and, therefore, no single model can be applied in all areas where mining activity is nearing its end. Many factors significantly influence the transition process: the specific conditions in each region, the degree of dependence of the local economy on mining activities, the adaptability of businesses, the workforce and the local community; the quality and the outcome of social dialogue. Each case should be considered separately through a transition plan that takes the specific characteristics and conditions of the regions involved into account.

The Just Development Transition Plan of lignite areas, launched by the Greek government in September 2020, revolves around three main axes: employment protection, compensation of the socio-economic impact of the transition and energy self-efficiency of lignite areas and the country in large. It includes a long list of investments supporting clean energy, the development of new industrial activities such as the manufacturing of batteries and battery chargers, smart agricultural production, and sustainable tourism. According to the Plan, these investments will create jobs in both emerging and traditional sectors of the economy, while preserving the environment and ecological stability of the regions involved. They will be supported by horizontal actions such as digital infrastructure, rapid training and reskilling of human resources, and entrepreneurship guidance among others.

At this important crossroad in time, it is especially important to consider the views and interests of the inhabitants of the lignite-dependent areas regarding the decarbonization and the Just Development Transition Plan. After all, they will be the ones who will primarily benefit from a successful transition, or suffer the consequences of wrong choices, omissions and delays. Their active involvement in both the planning and implementation of the transition plan is a prerequisite for the success of transition, as the examples of best practices from other countries show. It is worth mentioning that this requirement is also provided by the new regulation on the European Just Transition Fund which will finance part of the efforts[23].

In order to investigate the views and attitudes of the locals in the lignite areas, a quantitative survey via a questionnaire over telephone interviews was coordinated by the National and Kapodistrian University of Athens – Department of

[23] Regulation 2021/1056 of 24 June 2021 establishing the Just Transition Fund, article 11.

Political Science and Public Administration in collaboration with the think tank The Green Tank and the financial support of DiaNEOsis. The sample consisted of 802 people, aged 17 and over, in the two lignite areas (Western Macedonia and Peloponnese) during the period between 21-29 October 2020, while the public consultation for the Just Development Transition Master Plan (expiring on November 10, 2020) was on-going. The survey was conducted by 18 researchers and 3 supervisors by MARC SA polling company.

The research showed that regarding the government's decision to completely phase-out lignite by 2028 itself, the respondents understood the importance of the decision for the protection of the environment and the climate (Doussis & Mantzaris, 2020). However, they did not seem to have fully grasped the economic and irreversible impasse in which the Greek lignite industry had fallen. Nor did they understand the connection between the two, since due to the high climate ambitions of the EU, the European legislation was revised, and the cost of emission rights increased. The soundness of the decision for a complete lignite phase-out is still a matter of public debate in these areas. A significant percentage of respondents believe that the decision towards Greece's coal phase-out was imposed by the EU and that the decision was taken to serve the interests of the fossil gas industry.

The decision to proceed with coal phase-out caused negative feelings in most of the citizens who took part in the survey, while even more people are particularly pessimistic about the future of local economies, the expected rise in unemployment and the migration of young people. This view is widespread and is not limited to citizens whose family or personal income is related to lignite activity. However, it is understandable given the great dependence of the two areas on lignite activity.

Undoubtedly, the transformation of local economies in the deeply lignite-dependent regions of the country is an objectively difficult task. But one possible interpretation of the extent of negative sentiment and pessimism about the future has to do with the fact that more than 13 months after the announcement of the plan for complete decarbonization, public debate in lignite areas continued to revolve around the soundness of this choice and the possibility of a reversal of this decision, rather than around the day-after the end of lignite. This is despite the fact that about one in two citizens of lignite areas characterize coal phase-out as an opportunity to change the local development model and that the majority of citizens seem to have a clear image of the most important sectors of the economy that need to be developed in the new era, regarding local economies and their road to sustainability, including promoting agricultural production and the development of clean energy and energy storage technologies as key priorities. The Just Development Transition Master Plan includes these areas but few citizens (well below 50%) were aware that the latter was under public consultation during the period of the survey and even fewer were aware of the key proposals it contained. It is no coincidence that only 85 comments were submitted in the public consultation that ended on 10 November 2020. Most

responses came from institutions (NGOs, think tanks) and other stakeholders, rather than individuals.

In addition, there was a lot of confusion about the amount of money available for the just transition of the lignite areas, which may have intensified the residents' worries about the prospects for the success of the transition. Further, confusion and ignorance prevailed as to the timing of the completion of the lignite phase-out process. More than a third of respondents said they did not know the exact date of the planned cessation of lignite activity.

The negative attitude of the citizens may also be related to the centrally controlled way in which the Plan was drafted. The government followed a top-down approach to drawing up the Plan with a limited number of informative and consultation events with local communities. The restrictions imposed by the pandemic on the organization of such events might have also affected the outcome.

The research outcomes highlight that the interviewed citizens are interested in the implementation of the Plan and show increased confidence in the regional authorities and the municipalities in comparison to the central government on the key issue of governance. This preference may also be related to the view of most respondents that the long delays and wrong choices that led to today's challenges are mainly the responsibility of governments and not local authorities. It is worth noting that the Greek Steering Committee for Decarbonization does not include representatives of the local municipalities involved.

Based on the findings of the research, a large and systematic information campaign is considered necessary for the citizens of the lignite areas regarding the proposals that have been submitted to the public debate for the development of economic activities as well as the clarification of the amount and source of resources. It is important for citizens to receive reliable and comprehensible information about the options available and to understand the prospects for the future.

At the same time, a substantive, comprehensive and constructive dialogue with the inhabitants of the lignite areas is imperative to be launched; one that is to be direct and not involve numerous committees that would inhibit its success. Discussions and constructive consultations on a local level should take place with representatives of other local productive forces, active in non-lignite-related economic activities. If this happens, it is very possible that the "anxiety" of the locals will be alleviated to a great degree, and that the latter will be able to see themselves as active participants in the project of the transition. By extension, the strengthening of sound initiatives of local communities for the creation of energy communities based on renewable sources can also contribute towards the same direction. Consequently, a boost in such schemes (citizen-led co-ops) could contribute to the transformation of the production model of lignite areas, without the latter losing their identity as energy hubs.

Central to success of any attempt to just transition is the establishment of a permanent, multi-stakeholder governance mechanism for the transition to the post-coal era, which will operate for many years after the completion of

the planning, regardless of political affiliations or pressure. This mechanism would and should allow the various actors involved in local communities and civil society to interact, collaborate, and participate in decision-making regarding the planning and implementation of the transition. Towards this goal, examples from the experience of other European countries might be of interest.

### The 2021 National Recovery and Resilience Plan: Greece 2.0 and its 2023 update

Adequate financial support is another critical factor for a successful transition to climate neutrality. Greece has been allocated approximately €18,5 billion in grants from the EU Recovery Fund and the MFF to be disbursed by 2026, while it can also have access to additional resources. It is a significant amount of funding that offers a unique opportunity for the country to reorient its post-COVID 19 economy towards a development model that is sustainable, environmentally viable and socially inclusive (Vardakoulias, 2020).

In May 2021, the Greek government submitted a Recovery and Resilience Plan (RRP) to the European Commission, describing how it intends to use those funds. The green transition alone has secured €6,2 billion in grants, with an additional €9 billion in energy-related investment loans, supported by €3,7 billion from the RRF. This includes investments in upgrading the electricity network, clean technologies, and renewable energy sources, as well as a large program of energy efficiency renovation for buildings. Furthermore, the plan supports the development of local urban plans for strengthening the climate resilience of urban areas, a national reforestation program and a strategy to strengthen civil protection and disaster management systems, such as investments in flood mitigation.

Following the 2022 REPowerEU initiative, aiming to reduce the EU's dependence on Russian fossil fuels, Greece has revised its plan in August 2023, incorporating new investments and reforms under REPowerEU, including €795 million in EU funding and a request for an additional €5 billion in loans to meet high private sector demand. The updated plan prioritizes energy efficiency for households, businesses and public institutions; renewable energy storage and innovative projects such as biomethane, green hydrogen production, and carbon capture and storage technologies. It also includes land-use optimization for renewable energy development, increased grid capacity, and energy storage expansion.

The priority given to the green transition in the RRF, by securing 38% of its total allocation devoted to reforms and investments supporting climate-related objectives, is undoubtedly a very positive step towards the road to climate neutrality. It can accelerate the decarbonization process and support other necessary reforms to reorient the Greek economy towards sustainability. Its successful implementation can make Greece a pioneer in Europe and a best practice for other countries. It can also make Greece an important force to support the implementation of the EU "Fit for 55 package" and even a more assertive actor in Brussels.

Another initiative that should be mentioned is the establishment, in 2024, of the Decarbonization Fund for Islands by the Ministry of Environment and Energy in collaboration with DG Clima and the European Investment Bank. This new financing mechanism will use revenues from the auctioning of 25 million tons of unallocated $CO_2$ allowances. It will support the transition of non-interconnected islands to cleaner energy systems through projects ranging from hybrid renewable energy installations with storage, accelerated electrification and grid interconnection to infrastructure for electric vehicle charging. The fund will provide approximately €2,3 billion in funding from 2024 to 2030, with an estimated total expenditure of €5,6 billion depending on carbon prices.

**The 2022 National Climate Law**

In May 2022, a National Climate Law[24] has been adopted to better organize the transition to climate neutrality, focusing on those areas that need more coordination. The law provides the framework for the reduction of greenhouse gas emissions and achieve carbon neutrality by 2050, in line with the EU climate goals. Apart the goal of reducing greenhouse gas emissions at least 55% by 2030 compared to 1990 levels, it sets an interim target to reduce GHG emission 80% by 2040. Among others, the law provides the establishment, in 2024, of a five-year carbon budget for the most polluting sectors of the Greek economy, namely power production, industry, transportation, agriculture, buildings, forestry, waste and land use.

A central point is the coal phase-out, such as lignite in electricity production, by 2028. However, this target might be reconsidered in 2025, depending on security supplies.

The law determines that from 2023 specific corporations, such as banks, telecoms, power suppliers, water and waste utilities, logistic companies and retail businesses with over 500 employees, will need to submit annual reports for their carbon footprint of the previous year. It also includes important provisions about electric mobility, in particular for businesses. From 2024, at least a quarter of new private car leases acquired through leasing or purchase will be purely electric or hybrid electric vehicles. From 2026 all new taxis as well as one third of the new rental vehicles will be zero emission vehicles. Moreover, from 2030 new passenger and light commercial vehicles registered will be only zero emissions vehicles. New provisions for buildings are also included, such as the prohibition of installation of heating oil boilers from January 2025, while from 2030 only the sail of heating oil mixed with at least 30% by volume of renewable liquid fuels will be allowed.

By introducing this law, Greece followed the good example set by other countries inside and outside of the EU. Although they are not the same, these legal frameworks tend to draw on a set of common elements, including targets, carbon budgets, monitoring, public participation processes and scientific bodies. Certainly, there is still a lot to be done as the implementation of important

[24] Law 4936/ GG105 27/5/2022.

provisions is delayed, such as the obligation for municipal authorities to draw up five-year emission reduction plans due in March 2023. It is obvious that another way for central government to engage with local authorities is needed, rather than simply shifting responsibility to municipalities.

## 5. Conclusions: the way forward

Although significant steps have already been taken towards the implementation of the international and European climate goals, there are, however, several challenges and critical choices to be addressed in the near future. A very first challenge is how to replace the electricity that lignite provided so far. Will dependence from lignite be covered by renewable energy sources with energy storage technologies or by fossil gas which could lock the energy system in a high carbon intensity plan for many decades? A reconsideration of the national development plans in all economic sectors is needed to avoid wrong decisions (like those taken with lignite plants) and prevent investing in energy sources that will be deemed redundant or, even, useless in the long run, such as those related to (the projected) hydrocarbon extractions. These critical choices do not seem to be addressed in the updated version of the National Plan for Energy and Climate which considers fossil gas as "an increasingly important fuel in Greece"[25] (report p. 60) which has doubled its share in total final consumption over the last decade[26]. Most gas was imported from Russia, and Greece "is planning to improve the security of supply … by enhancing liquefied natural gas (LNG) imports and expanding its role as a gas hub for the South Eastern Europe gas market"[27] (ibid).

The NPEC considers the fossil gas as a 'transitional' energy source while it is ambigious on the time limit for the total phase out of fossil fuels. For instance, it is not mentioned how the ongoing hydrocarbon extraction programme (i.e. new fossil fuels extraction)[28] is compatible with the international obligation of "transitioning away" of fossil fuels as well as the European goal of achieving climate neutrality by 2050.

Another challenge relates to the implementation of the Just Development Transition Plan of the lignite areas and the restoration of their surrounding environment. Given the very short timeframe, the need for a successful delignification process as well as the restoration of the environment is imperative to mitigate the effects on the local economy and society. Closely related to this issue is to find ways to track private financial flows to increase climate finance

[25] Sixth Biennial Report under the UNFCCC (December 2024), p. 60, available at https://unfccc.int/documents/645147 (accessed on 6/1/2025).
[26] Ibid.
[27] Ibid.
[28] For further information, see Doussis et al. (2022), Hydrocarbon extraction vs offshore wind: can Greece become a green energy hub in the Mediterranean?, Policy paper, The Green Tank.

aiming at securing the just transition and other related climate goals. So far Greece's current emphasis is on tracking public financial flows associated with climate change[29].

Finally, the support of society is absolutely necessary. The transition to climate neutrality where no one will be left behind will fail if society is not effectively integrated in this effort. This can be achieved by building better bridges of communication between science, politics, and citizens. The coronavirus pandemic has been an indisputable lesson in the need of systematic, targeted, and official information in collaboration with science, and the same applies to climate change. There is a need to find a common language of communication to inform citizens as to why the transition to climate neutrality is necessary and to keep them "in the loop" regarding the dilemmas that arise in this process. Moreover, the government must explain that there are no "magic" solutions to address climate change, inform them about the opportunities and how citizens can contribute to this effort. The formal consultation process has shown its limits and it is time for new participatory and more inclusive arrangements to be provided to enable relevant stakeholders and citizens to co-design sustainable solutions.

What the coronavirus pandemic has shown is that there is a need to rely more on scientific knowledge for policymaking and legal frameworks. However, the implementation of the relevant decisions and legal frameworks presupposes the cooperation of society. To achieve the goal of climate neutrality, it is not enough for governments to take measures and the administration to be committed to the implementation of these objectives, nor the individual awareness of the private sector and organized civil society. The coordinated mobilization of all actors and citizens for the part that corresponds to each one is essential.

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# Policy change, port governance and climate policy in the European Union*

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## Abstract

As not all European policy sectors have the same strength, does a focusing event assist on the creation of an EU-wide policy? After the adoption of the European Green Deal in 2019, there is a turn into European policies becoming more climate friendly. This article explores the case of the European port governance, a sector governed mostly intergovernmentally and not directly contributing to the fight against climate change. The article delves into the European Studies literature, utilizing it as empirical data, along with European legislation, to showcase that port 'policy' has not been developed and that the penetration of climate policy might lead to a faster development of the former than expected.

**Keywords:** Climate policy; port governance; European Studies; European Green Deal; policy change

# Αλλαγή πολιτικής, λιμενική διακυβέρνηση και κλιματική πολιτική στην Ευρωπαϊκή Ένωση

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## Περίληψη

Με την υιοθέτηση της Ευρωπαϊκής Πράσινης Συμφωνίας το 2019, υπήρξε μια τάση στις Ευρωπαϊκές πολιτικές να γίνουν πιο φιλικές προς την κλιματική αλλαγή. Το παρόν άρθρο, αντιμετωπίζοντας την Ευρωπαϊκή Πράσινη Συμφωνία ως σημείο καμπής της διαμόρφωσης πολιτικής στην Ευρωπαϊκή Ένωση, μελετά την περίπτωση της Ευρωπαϊκής λιμενικής διακυβέρνησης, ενός κλάδου που είναι κυρίως διακυβερνητικός και δεν συμβάλλει άμεσα στις προσπάθειες καταπολέμησης της κλιματικής αλλαγής. Το άρθρο εξετάζει την ακαδημαϊκή βιβλιογραφία στον τομέα των Ευρωπαϊκών σπουδών, αξιοποιώντας τη ως εμπειρικό υλικό, καθώς και την Ευρωπαϊκή νομοθεσία, με σκοπό να αναδείξει ότι η λιμενική «πολιτική» δεν έχει αναπτυχθεί και ότι η διείσδυση της κλιματικής πολιτικής σε αυτήν μπορεί να οδηγήσει σε ταχύτερη ανάπτυξη της πρώτης από το αναμενόμενο.

**Λέξεις κλειδιά:** Κλιματική πολιτική, λιμενική διακυβέρνηση, Ευρωπαϊκές σπουδές, Ευρωπαϊκή Πράσινη Συμφωνία, αλλαγή πολιτικής.

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## 1. Introduction and context

Ports are essential gateways for global trade, acting as catalysts for economic development across countries. They facilitate the flow of seaborne trade, with thousands of ports worldwide handling immense volumes of cargo (Alamoush et al. 2022). In Europe, and in particular in the European Union (EU), ports play a particularly vital role by connecting transport corridors to the global market, thereby supporting the exchange of goods within the internal market and linking peripheral and island regions to the continent's mainland (European Commission 2024c).

Despite their crucial role in the global economy and supply chains (which leads to think that they would be included in the efforts for the reduction of greenhouse gas emissions (GHG)), ports and ships remain heavily reliant on fossil fuels, leading to significant anthropogenic emissions and environmental externalities, including GHG emissions and air pollutants (Alamoush et al. 2022). Notably, within the maritime sector, approximately 6-7% of GHG emissions occur while ships are berthed in ports across the European Economic Area. This statistic underscores the urgent need for a paradigm shift toward greening shipping practices and transforming port services into sustainable operations (Jacobs 2022).

As global trade continues to expand, prioritizing sustainability in port activities is essential to mitigate environmental impacts and achieve long-term economic resilience in shipping. In this context, there is an imperative need for decarbonization in maritime transport. Ports can serve as facilitators for the greening of shipping, engaging with stakeholders to promote comprehensive policies for carbon reduction. Moreover, climate change has underscored another vital role of ports: beyond merely transferring goods, they are becoming critical energy hubs for both conventional and renewable energies (Jacobs 2022). This evolving role has been recognized by the European Commission, which has adopted a series of initiatives to enhance this function and further support the decarbonization of the maritime sector, ensuring that ports not only contribute to economic growth but also to environmental stewardship. However, it is important to note that an overarching EU port policy, which could facilitate decarbonization through its climatization, does not currently exist.

From the point of view of political science (and international relations (IR)), transport policy in general and shipping in particular remains an under-researched topic. Transport policy has usually been seen as rather technical and without interest for scholars studying politics or policymaking, thus, remaining on the bench of analyses. Nevertheless, nowadays, a turn is starting to be observed: transport policy has been catching interest of political scientists and IR scholars more and more, as it becomes more and more politicized. The reason for this politicization is the infiltration of a different policy field in the way transport works. This field is climate policy, which today is the one of the main priorities in the European Union's (EU) internal and external policy (Dikaios 2024). As the EU is one of the largest international trade players globally, and its trade takes place mostly through maritime

transport (European Commission 2025a), climate rules have started impacting how shipping, ports and supply chains connected to maritime affairs operate.

During the initial research for this article, and to the best of the author's knowledge, it was observed that scholarly articles on EU port policy, stemming from political science and/or IR, were not existent. Based on this, the rationale behind the desk research methodology employed for this article is to discover such scholarly pieces and analyze them both quantitively and qualitatively. Moreover, the empirical data is complemented by European legislation on the subject at hand. The article explores whether there is a shift regarding ports' governance, driven by the developments emanating from the European Green Deal. To do so, it devises an analytical framework that emerges through the field of 'policy change'.

The next part connects the EU climate policy with the EU's port governance, setting further the context. It is followed by the part that presents the analytical sketch of the article, which interrelates the notion of policy change with that of focusing events. The following parts analyze the results, presenting also the methodological approach, while a discussion and conclusion part completes the article.

## 2. Setting the scene of climate policy and port governance: A new interconnection for the EU?

While there is an abundance of literature examining the impacts of climate change on ports' operation coming from different disciplines (e.g., maritime studies, engineering, economics, etc.; see, indicatively, Becker et al. 2018; Devendran et al. 2023; Izaguirre et al. 2021; León-Mateos et al. 2021), there are only few pieces that discuss the subject from a political science perspective – not always published in political science /IR journals.

A significant aspect of transport policy lies in the functioning of ports, which can play a crucial role in the effort to decarbonize transport systems. To fully understand their impact, it is important to examine the EU port governance regarding climate change. As noted by several scholars (e.g., Pallis 2006; Thomas and Turnbull 2017; Verhoeven 2009), a common and consistent EU port policy has yet to be established. Although attempts have been made since the early 2000s to create a unified port policy -such as the 2001 White Paper on "European Transport Policy" and the 2011 "Roadmap to a Single European Transport"- various obstacles have emerged, primarily due to the differences among the ports of EU member states. According to Pallis (2006), EU ports have evolved in diverse ways that reflect their distinct markets and national characteristics, unlike other areas of the transport sector. A key issue highlighted by Pallis is the challenge of implementing a 'one size fits all' approach, given that each EU port is unique in terms of its market, geography, management, operations and employment. Furthermore, differing port traditions contribute to varied contemporary management and organizational strategies across these ports. Therefore, achieving a cohesive EU port policy would require legislation capable of addressing the complex and heterogeneous structures and policy transitions inherent to the sector (Pallis 2006).

The article of Pallis was published in 2006. Since then, the evolution of the port governance in the EU emphasizes mostly in competition matters and financial issues. It is telling of this slow evolution and lower attention to the ports' topics, that the current page of the European Commission dedicated to "Ports" still mentions the following: 'This initiative is currently under assessment and the proposal for the way forward is expected to follow in summer 2018' (European Commission 2024c). Moreover, the latest Regulation mentioned is one from 2017.

Since climate change began to significantly impact maritime transportation, a new discourse on the governance of ports has sparked. In particular, van Leeuwen (2015) observed that since the 1980s, there has been a noticeable trend towards regionalization in maritime governance concerning environmental matters. This shift can be attributed to the declining ambition of the IMO and the ineffective enforcement of its standards. As a result, this has prompted the establishment of stricter environmental standards and improved enforcement mechanisms within regional maritime governance. This pressure has facilitated the adoption of more effective global standards within the IMO, making regionalization a tool for enhancing the effectiveness of maritime governance (van Leeuwen 2015). Moreover, Puig et al. (2021) emphasized on the importance of collaboration among port authorities, stakeholders, and policymakers in promoting innovation and sustainability in port management, particularly considering climate change. Finally, Monios et al. (2024) recently identified four key groups of governance actors related to port governance in the context of climate change, one of which includes international shipping governance, involving the case of the EU. Traditionally, this group has not been closely associated with port governance since ports operate within national jurisdictions. However, the article notes that environmental regulations from the EU and IMO -such as decarbonization and low sulfur mandates- significantly influence ports' decisions regarding bunkering options and the inspection requirements for ship compliance (Monios et al. 2024). Three key findings are highlighted further in the literature (Monios et al. 2024; Puig et al. 2021; van Leeuwen 2015); first, climate change emphasizes the necessity for a shift in port governance to effectively tackle its environmental impacts; second, there has been a regional increase in effective measures to combat climate change within maritime transportation; third, these environmental challenges have enabled the EU to play a more assertive role in the decarbonization of the port sector. Does this crucial role of the EU in port management, highlighted by the impact of climate change on transportation, suggest a shift in port governance and could possibly prompt renewed discussions about an EU port policy?

Decarbonization, or as the EU frames it through its 2019 European Green Deal, climate neutrality, is the goal to produce net zero GHG emissions by 2050 and to detach economic growth from resource use. In this effort, there is an intermediate goal of reducing 55% of the greenhouse gas emissions by 2030, crystalized in the Fit for 55 package. The Fit for 55 package specifies how each sector of human activities should reduce its emissions and promotes the adoption of several legal measures, in order to succeed in the said ambition. Concerning mar-

itime transport, four are the main new European Regulations and Directives that will alter its business-as-usual operation: (1) the EU Emissions Trading System Directive (extension to maritime transport); (2) the Regulation on the use of renewable and low-carbon fuels in maritime transport (FuelEU Maritime initiative); the (3) Regulation on deployment of alternative fuels infrastructure (AFIR); and, the (4) Energy Taxation Directive (extension to maritime transport). The Regulation most related to ports is the AFIR, which foresees the creation of recharging and refueling stations for alternative fuels in ports, aiming to mitigate the emissions emitted during the stay of the ships in the ports. The above legislation sets the basis to interconnect climate policy with port governance in the EU; this will possibly occur through a systematic policy change initiated within the EU.

## 3. Policy change: An analytical sketch infused by focusing events and climate change

Policy change is highly associated in the literature with ideas, institutions, advocacy groups, policy learning, etc. (e.g., Béland 2009; Bennett and Howlett 1992). Moreover, there is recent literature concerning policy change published in 2000s (Arts et al. 2006; Capano 2009; Richardson 2000; Schmidt and Radaelli 2004). Additionally, aspects that can be attributed to policy change can be found in several studies that delve into the policy cycle or part of it (see for a literature review Howlett and Cashore 2009).

The literature on policy change can be seen as chaotic and, at the same time, excessively systematic, deep and comprehensive. Various models, factors and mechanisms have been utilized and put forward to explain series of different phenomena in policy changes (Carter and Jacobs 2014; Schmidt 2011; Wilson 2000). This article takes a different point of view and macroscopically explores whether any change is apparent in the EU port policy (or governance) after the adoption of the European Green Deal.

This article is taking the European Green Deal as a focusing event for the evolution of the EU port policy/governance system. The reason for this is that activities related to shipping where not expected to mitigate GHG emissions before the 2018 *Initial Strategy on the Reduction of Greenhouse Gas Emissions from Ships* of the International Maritime Organization. The EU, having committed to it -and in general to climate neutrality-, with the European Green Deal (and the consequent European Climate Law and the Fit for 55 package) set tangible goals for mitigating the carbon footprint of all the activities that take place within the EU. These activities include transportation in general, shipping in particular and, consequently, ports.

Focusing events, according to Alexandrova, 'are sudden, striking, large-scale occurrences that attract political attention' (2015:505). Therefore, one can claim that the adoption of the European Green Deal was a focusing event for the shipping industry at large, which claims that it is the most sustainable transport

mode, emitting significantly less than the others (World Shipping Council 2025). Although focusing events have so far been solely associated to disasters (Birkland 1997), this article deviates from this rationale, by claiming that focusing events can be a well-expected situation that has not borne (significant) results prior to its appearance. Thus, one can expect that the European Green Deal acted as a focusing event which impacted on the evolution of greener port policies. While not a sudden event, it is not frequent to propose an umbrella policy that covers -and expects changes in- all policy fields, and, consequently, introduces noteworthy transformations in the policy cycle of the policies affected. Besides, frequency and impact are also necessary factors for an event to be considered as focusing (Alexandrova 2015).

Coming back to policy change, this article adapts Howlett and Cashore's (2009) figure on the mode and speed of policy change, which is based in two basic concepts, namely, paradigmatic change and incremental change. Similar to definitions given by several scholars (Howlett and Cashore 2009; Mintom and Norman 2009; Wilson 2000), paradigmatic change is defined here as when an abrupt change takes place, that is not expected in the course of a policy's evolution, while incremental change is when a step-by-step approach is applied aiming to minor alterations that will allow for a greater change in the end. Moreover, the figure is complemented by the focusing event concept, which spurs change.

Table 1: Composite model of policy change when focusing events happen. The table has been based on the work Howlett and Cashore 2009.

| | Speed of change | | |
|---|---|---|---|
| Mode of change | Slow | Fast | Focusing event |
| Paradigmatic | | | When the speed of change is slow , a focusing event makes things move faster. In case no action towards policy change is taking place, a focusing event might lead to either a slow or fast speed of change, in both paradigmatic and incremental modes. |
| Incremental | | | |

For Mintrom and Norman (2009), incrementalism puts consecutive barriers to major policy changes. They argue that this happens in the name of political stability or risk evasion that would create imbalances both in the policymaking processes and political integrity. Wilson (2000), seconding this argument, claims that incrementalism is the mantra of political stability. It is interesting to note, that scholars who work on policy change, utilize similar literature which mostly

emanates from the policy cycle approach, and use catastrophes as examples (or as factors /mechanisms of change). In this article, as argued above, the change begins from a purposefully adopted policy change which significantly impacts other policies and (potentially) creates multiple venues of change in the latter's notions, ideas, institutions and processes. In the case under examination, this policy change is the climate policy of the EU, which is known to be one of the most comprehensive globally (Dikaios 2024). The EU climate policy, traditionally, aimed specifically to mitigate GHG emissions in the EU. In 2019, the European Green Deal proposed a holistic approach to decarbonizing the European continent with target measures for the majority -if not all- human activities and to adapting to the negative effects of climate change.

## 4. EU port and climate policy in European Studies literature

To analyze the potential shift toward a unified EU port policy as a result of growing concerns about climate change in the transport sector, the research is structured into two distinct periods in order to compare the results: 2013-2018 and 2019-2024. The rationale for this specific division is rooted in significant port policy developments: in 2013, the European Commission initiated efforts to specifically enhance port operations and connectivity at 329 key seaports and, in 2019, the adoption of the European Green Deal marked a pivotal moment for the EU, emphasizing the need for decarbonization within the transport sector as well, which includes initiatives focused on EU ports. Moreover, this division is convenient to extract results as it is equal in time (six years each).

As observed earlier, there were no mentions found in the literature regarding EU port policy and its relation to climate change. Therefore, in order to confirm this observation, the first task was to conduct a targeted and comprehensive search in key political science/IR journals, with a special focus in European studies and in particular European policy-making. These journals are the *Journal of European Public Policy*, the *Journal of European Integration*, the J*ournal of Common Market Studies*. The analysis involved a thorough evaluation of results across various fields, including titles, authors, keywords, abstracts, affiliations, and funding sources. However, the outcomes of this exploration indicated a significant scarcity of the relevant literature. The terms utilized for the search were, first, "port(s)" and, second, "port climate".[1]

Concerning the term "port" for the period 2013-2018, out of the six articles that were identified using the term in an essential manner, only two articles employed it in both the title and the text, both written by Leiren (2014a; 2014b).

[1] The reasoning for proceeding with researching the terms 'port(s)' and 'port climate' is that the search was focusing on journals of European Studies, so using the term 'EU' leads to redundancy; similarly, the use of the term 'policy' yielded results concerning other EU policies or in general, which diverted the focus from the domain of ports, and as such it was removed.

The one article focused on the ways labour unions opposed a proposed EU port directive in 2000s, within the European decision-making process, while the other extended the research focus also in other transport modes and the post service scrutinizing their liberalization. The rest of them used the term 'port' within their content; nevertheless, the articles were not related to EU port policy or governance, apart from the one by Thomas and Turnbull (2017), which discusses the ways the European Commission attempts to develop a common European ports policy through framing techniques and by using specific language. Crespy and Parks (2017) utilize the proposed port directives as an example to explain opposition within the European Parliament; Kissack's (2015) article explores, among others, the role of ports in implementing maritime labour standards; and Suda (2013) mentions ports in the broader field of transportation security.

Continuing with the results of the 2019-2024 period of the same term -port- five articles were pinpointed that used this term more than twice within the content. Schmidt-Felzmann's (2020) article uses the example from two ports in Sweden to illustrate the overall challenges pertaining to the Russian gas supply through the Baltic Sea. Dyevre and Lampach's (2020) article introduces a new dataset that compiles the geographic coordinates of all courts that have referred cases to the European Court of Justice, and among the potential determinants of judicial participation in the system is the presence of large cargo ports. Freedman (2021) connects ports with the challenge of migrants' and refugees' security. Jarlebring's (2023) empirical part includes the examination of fisheries, where ports are mentioned. Finally, Szabó et al. (2022), about ten years after Leiren (2014a; 2014b), write again on the port services directive and liberalization.

It is also important to mention that more than 35 articles were identified that used the word "port" within their text (12 during the period 2013-2018; 23 during 2019-2024); however, the references were fewer than two or three and mainly included specific port countries, without essential policy implications.

Regarding the term "port climate", results were found only in articles from the period 2019-2024 and in two of the three journals under consideration, i.e., the *Journal of European Public Policy* and the *Journal of Common Market Studies*. In particular, three articles were identified. Specifically, the article by Turner et al. (2020) presents the strongest link between the two subjects, as it mentions the potential use of carbon capture and why it is progressing in specific European industrial centers, like the Port of Rotterdam. Proedrou (2019) in his last paragraph mentions the same Port as the way forward for climate/energy transition, while Badell and Rosell (2021) test whether EU institutions are still green actors, including towards their multiple variables ports.[2]

Thus, none of the results in either period or from either search has pointed to articles that examine EU port policy and specifically connect it with the subject of climate change.

[2] There is also the article of Zhang and Wang (2019), which explores how social media affect public opinion, which mentioned a single port incident, while the article tested -independently to the port mentioned- climate events.

Lastly, to further broaden the scope of the research, the JSTOR database was included focusing on political science literature published in English during the abovementioned periods. This search was restricted to titles, abstracts, and captions to manage the volume of results efficiently. Despite these limitations, our exploration of the terms "European Union" AND "Port Policy" and "European Union" AND "Port Policy" AND "Climate Change," yielded no relevant results.

## 5. EUR-Lex

As the research on secondary literature did not bear any fruits, in order to expand the data of this empirical part, a quantitative methodology was employed, utilizing EUR-Lex in order to search port regulations adopted between 2013 and 2024, following the same division of time, i.e., 2013-2018 and 2019-2024. The following Table (2) presents the information gathered, which is analyzed right after:

Table 2: EUR-Lex results of the terms 'port(s)' and 'port climate'

| Term | Year | Results of documents | Results of documents by author (i.e., European Commission[3]) |
|---|---|---|---|
| "port(s)" | 2013 | 763 | 359 |
| | 2014 | 740 | 286 |
| | 2015 | 582 | 222 |
| | 2016 | 864 | 293 |
| | 2017 | 815 | 287 |
| | 2018 | 966 =T: 4,730 | 297 = T: 1,744 |
| | 2019 | 1002 | 389 |
| | 2020 | 795 | 330 |
| | 2021 | 1076 | 421 |
| | 2022 | 1010 | 346 |
| | 2023 | 1158 | 448 |
| | 2024 | 803 =T: 5,844 | 321 = T: 2,255 |

[3] The European Commission is selected to be mentioned in this Table as it was the author with the highest number of documents.

| Term | Year | Results of documents | Results of documents by author (i.e., European Commission) |
|---|---|---|---|
| "port climate" | 2013 | 292 | 133 |
| | 2014 | 283 | 111 |
| | 2015 | 190 | 74 |
| | 2016 | 267 | 108 |
| | 2017 | 276 | 111 |
| | 2018 | 334 =T: 1,642 | 122 =T: 659 |
| | 2019 | 346 | 171 |
| | 2020 | 328 | 157 |
| | 2021 | 504 | 219 |
| | 2022 | 372 | 156 |
| | 2023 | 612 | 258 |
| | 2024 | 298 =T: 2,460 | 135 =T: 1,096 |

Between 2013 and 2018, EUR-Lex identified a total of 4,730 documents that included the terms "port(s)" in their titles or content, and 5,844 in the subsequent period between 2019 and 2024. This is an overall increase of about 23%. Within these documents, the ones which included both the terms "port" and "climate", saw a respective increase comparing the two periods: during the first one 1,642 documents were identified, while in the second period the number was 2,460. This is an increase of about 50%.

Complementary, it is important to note that in both searches, i.e., 'port(s)' and 'port climate', the author with the most documents recorded was the European Commission, particularly in the second period between 2019-2024. More specifically, the percentage of the overall documents generated by the European Commission during 2013-2018 were about 36,9% for the term 'port' and 40,1% for the terms 'port climate', while for the period 2019-2024 the respective numbers were 38,6% and 44,6%.

During the same period (not depicted in Table 2, but an interesting aspect to note), there was also a noticeable increase in the adoption of these documents through the Non-legislative Procedure (NLE) rather than through the Ordinary Legislative Procedure (COD), which is also very well known in the European jargon as codecision. According to the EU law, the NLE refers to non-legislative acts

that take place interinstitutionally, including delegated and implementing acts, adopted usually by the European Commission or the Council of the European Union, in order to elaborate on a legislative act (European Commission 2025b).

## 6. Discussion, conclusion and the way forward

The empirical data from the EUR-Lex dataset strongly suggests that indeed there is a turn in the EU port governance, incorporating more and more climate policy's targets. It also suggests that more focus on ports is given in the European policy-making processes. The data found in scholarly literature is scarce and cannot constitute for strong arguments, but a slight turn can be observed, mainly in a growing interest of the role on the ports from a political science/IR perspective. The connection with climate change policy comes eclectically, usually utilizing ports as an example, among others, to showcase climate policy developments. This turn can be attributed to the European Green Deal and the growing literature on the EU climate policy (e.g., Badell and Rosell 2021; Proedrou 2019; Turner et al. 2020). Prior to 2019, no articles combining the two subjects were found.

Although the overall results do not offer solid foundations for a deep analysis, there are some analytical conclusions that can be drawn. More specifically, paradigmatic and incremental changes cannot always explain changes because they explain the internal process of the policy change, while a focusing event comes to explain a reason that potentially leads to policy change. Incorporating focusing events in the policy cycle process, without the former being catastrophes or disasters as the theory suggests, might be applied as an interesting explanatory factor for the changes that are due to take place in the period of poly-crisis, where phenomena that are already governed (either super-regulated such as climate change or newly-regulated such as, e.g., artificial intelligence), have severe impacts on policies that they were well-established up until now and had their own processes. This is what usually is called in the literature -ization (climatization, securitization, etc.). In the case under examination, namely the EU port governance, policy changes stemming from the need to decarbonize the port sector and to adapt to climate change, might lead to the development of a coherent port policy which has not managed yet to crystallize. Therefore, the European Green Deal can be considered as a focusing event on this case, if we take into account the increase of relevance both in the literature and the European legislation. The latter, as a stronger indication, suggests that the development of the European port policy -if it eventually and gradually takes place- will possibly go through its climatization, i.e., incorporating climate targets (emanating from the overall EU climate policy) to its goals.

Therefore, although through paradigmatic and incremental changes one can understand the processes that (will) allow for the EU port governance to become climatized, they will not explain how and why this change came to the fore. The reason for this is this, especially in the present case study, is that a different policy -not directly connected to ports- grows robust enough to be able

to broadly influence other policies as well. This is not due to an abrupt event or a step-by-step approach that takes place within the ports' governance system, but due to an external situation that puts pressure on the former. Thus, to better understand the complexities of the policy change, there has to also be a comprehension of the 'focusing event', as we identified it here, that leads to this change. Moreover, the 'focusing event' might also lead to the paradigmatic and the incremental changes to happen concurrently, empowering one another.

Some questions that arise from the analysis at hand and open future research paths are: What was the role of the European Green Deal as a focusing event on this case? Did it allow for a paradigmatic change that altered the course of the EU port policy at once and for the foreseeable future to be more sustainable-oriented, or did it open the road for incremental changes to start building up, although the goals for decarbonizations are sooner than this mode will achieve? These questions can only be answered in the future, after an EU port policy has been better founded. It is also worth to note that the results from EUR-Lex highlight a situation that is prevalent in other policy changes that have to do with the climatization of the broader maritime /shipping policy, namely the role of the European Commission as a pioneer of this process (Dikaios 2024). Additionally, the augmentation of the NLE highlights a potential stronger supranationalization of the subject.

Validating to the incoming trend of climatization of the EU port policy are the changes happening in the legislation, mentioned briefly in the Introduction. More specifically, following the adoption of the European Green Deal in 2019 and the legislative initiatives outlined in the Fit for 55 package, there has been a significant focus on alternative fuels and energy efficiency in port infrastructure from 2019 to 2024. These measures reflect an overarching trend toward the greening of shipping, which subsequently fosters the development of sustainable infrastructure for alternative fuels within port services. The latter has also been confirmed by the latest Environmental Report of the European Sea Ports Organization (ESPO), published in 2024, which indicates that from 2020 to 2024, climate change ranks either first or second among the top ten environmental priorities of the port sector (ESPO, 2024). Notably, the introduction of the Fuel EU Maritime Regulation in 2023 significantly enhances the production and adoption of sustainable, low-carbon fuels in maritime transport. It also mandates that vessels utilize On-shore Power Supply (OPS), thus positioning ports as essential facilitators in this transition (Jacobs 2022). According to the 2024 ESPO Report, the OPS system -recognized as one of the three principal green services offered by ports-[4] enables ships to connect to the electricity grid while docked, thereby presenting substantial opportunities to mitigate the environmental impact of maritime operations. Furthermore, the new Regulation on the Deployment of Alternative Fuels Infrastructure (AFIR) (Regulation 2023/1804), which repeals Directive 2014/94 on Clean Power Transport, is designed to ensure minimum infrastructure requirements to support the uptake of alternative fuel vehicles across all transport modes in EU Member States, aligning with the EU's

[4] The other two are Liquefied Natural Gas bunkering facilities and Environmental Differentiated Port Fees (ESPO, 2024).

climate objectives (European Commission, 2024a). Finally, Regulation 2024/1679, which revises the Trans-European Transport Network (Ten-T) policy originally instituted in 2013 and identifies ports as key nodes in the transport network, seeks, upon a more robust framework, to diminish the environmental and climate impact of transportation while enhancing the safety and resilience of the network (European Commission, 2024b). All these can work as starting points for further and more elaborate research into the politics, policy-making and other political phenomena of the (EU) port policy.

To conclude, the EU port policy can also offer insights to regional integration. As, traditionally, ports are mainly governed at the EU Member State level, the codification of new common rules for ports, will create the necessary conditions to lead to a case of European port integration. This, as mentioned earlier, failed in the 2000s and no significant steps have been taken since then. Nowadays, climate change policy might offer the path to bring back to life a neglected for many years policy field. The scarcity of political science literature on EU port policy underscores the nascent state of this area of study. Nevertheless, the analysis indicates a marked trend toward a more proactive and assertive role of the EU in the management and governance of port infrastructures, particularly concerning the challenges posed by climate change, while the introduction of the Fit for 55 package may signify the inception of a concerted effort toward a unified EU port policy. In conclusion, while the current literature may be limited, the evolving dynamics of climate policy present an opportunity for the EU to redefine its role in the port sector, facilitating a transition towards sustainability while addressing the challenges posed by climate change.

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# Taking stock of the Greek climate change adaptation processes: compliance with and efficiency of the institutional and legal framework

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## Abstract

Increased natural disasters and the incurred high losses have made climate change adaptation an imperative globally and regionally. Greece too has recently experienced some of the most severe disasters in its modern history. With this in mind and in view of the imminent amendment of its national adaptation strategy, the latter's efficiency and compliance are explored, in conjunction with the respective international and European framework. It is argued that the lenience observed therein has been carried over to the Greek case, leaving room for a potentially incohesive division of competences of questionable efficiency and poor monitoring and compliance procedures.

**Keywords:** Climate change adaptation; national adaptation strategy; regional adaptation strategy; efficiency; compliance

# Αξιολογώντας τις διαδικασίες προσαρμογής στην κλιματική αλλαγή της Ελλάδας: συμμόρφωση με το θεσμικό και νομικό πλαίσιο και αποτελεσματικότητα

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## Περίληψη

Οι αυξημένες φυσικές καταστροφές και οι υψηλές απώλειες έχουν καταστήσει την προσαρμογή στην κλιματική αλλαγή επιτακτική σε παγκόσμιο και περιφερειακό επίπεδο. Τα τελευταία χρόνια, η Ελλάδα έχει και αυτή βιώσει μερικές από τις πιο σοβαρές καταστροφές στην πρόσφατη ιστορία της. Λαμβανομένων υπόψιν αυτών και ενόψει της επικείμενης δυνατότητας τροποποίησης της εθνικής στρατηγικής για την προσαρμογή, διερευνάται η συμμόρφωση και η αποτελεσματικότητα αυτής ως προς το διεθνές και ενωσιακό πλαίσιο. Υποστηρίζεται ότι η επιείκεια που παρατηρείται σε αυτό έχει μεταφερθεί και στην ελληνική περίπτωση, αφήνοντας περιθώρια για μια πιθανώς μη συνεκτική κατανομή ευθυνών αμφίβολης αποτελεσματικότητας και ανεπαρκών διαδικασιών παρακολούθησης και συμμόρφωσης.

**Λέξεις κλειδιά:** Προσαρμογή στην κλιματική αλλαγή, εθνική στρατηγική προσαρμογής, περιφερειακή στρατηγική προσαρμογής, αποτελεσματικότητα, συμμόρφωση

## 1. Introduction

According to the United Nations Office for Disaster Risk Reduction, during the 2000-2019 period, climate-related disasters globally have risen by more than 45%, compared to the previous twenty years, amounting to around 6700, most of which were floods, followed by storms, heatwaves, droughts and wildfires. And these disasters have affected billions of people worldwide and have caused a multitude of deaths, while also accounting to losses of several $ trillions. And although the most disaster-prone continents have been Asia, the Americas and Africa, Europe has not remained unharmed (2019).

As per the European Environment Agency estimations, for the period from 1980 to 2023, weather- and climate-related extremes (storms, floods, heatwaves, cold waves, droughts and forest fires) caused estimated economic losses of around €738 billion in the EU (2024). In fact, a little over 20% of the total losses account only for 3 years, from 2021 to 2023. This means that the economic losses for the whole period translate into a rough average of €17.2 billion of yearly losses, while the average for the latest 3 years is around €54 billion. In turn, this shows that adaptation costs have grown significantly in the past years, potentially establishing a new trend of really high yearly losses.

Greece has not remained unharmed either, experiencing damages of around €16.35 in the same period. And although it "scored" well below the EU average in terms of economic losses, other factors like the non-insured economic losses and the fatalities were disproportionately higher in relation to its overall economic losses (Ibid). This is not surprising, taking into account that in the past few years it has experienced some of the most calamitous natural disasters of its modern history. Specific disasters stand out, like the 2018 fire in Mati, in the Attica Region, which claimed the lives of more than 100 people and injured hundreds, while directly affecting more than 4,500 people and households (Organisation of Economic Cooperation and Development 2024). Moreover, the 2023 megafire in Dadia, Evros, in the Eastern Macedonia and Thrace Region, cost two people their lives but had an immeasurable environmental toll: it scorched more than 940,000 decares of forests and wooded land in the Dadia-Lefkimi-Soufli Forest National Park, thus becoming the largest single fire to occur in Europe since the 1980s (Hellenic Fire Brigade 2023; European Commission, EU Science Hub 2024). Yet, maybe the biggest disaster occurred on 5-7 September 2023, in the Region of Thessaly. The latter was struck by Storm Daniel, a once-in-a-1000-year weather event, where extreme rainfall caused extensive floods and loss of livestock, human lives, harvests, land, and assets, with overall damages of more than €2.2 billion (HVA 2023).

In this context, the case of Greece's performance regarding climate adaptation stands out. The questions which reasonably arise are to what extent Greece has developed its adaptation policy framework and whether or not that is effective. To address the former question, the article first presents the international framework for climate adaptation and that of the European Union (EU). This is done because Greece's own framework derives mostly, if not wholly, from them, rather than nation-

al initiatives. In turn, the Greek framework is presented, as it stems from the official documents it has adopted. To address the latter question, emphasis will be given on the European framework and especially specific guidelines for adaptation that the EU has published. Greece's adherence to those will be explored in the discussion, in order to define the efficiency of its national framework based on those standards.

## 2. A lenient international and European framework?

### 2.1 The international context

Mentions to adaptation in the international climate treaties were sparse and scarce. The 1992 United Nations Framework Convention on Climate Change (UNFCCC) only recognised adaptation as a key focus area for action. For instance, Article 3 identifies adaptation as one of the ways through which states should take precautionary measures to anticipate, prevent and minimise the causes and impacts of climate change. Thus, as posited in Article 4, states should adopt, implement and regularly update national and regional adaptation programmes and measures. In the same article international and transnational cooperation was also proposed as a means to formulating adequate plans for a series of sectors, like coastal zone management, water resources and agriculture. Finally, the importance of technology transfer, and financial assistance for adaptation measures from the developed towards the developing countries was highlighted in the same article (United Nations 1992: 4-8).

The Kyoto Protocol too included some mentions to climate adaptation, despite its heavy focus on the allocation of mitigation efforts. However, it did not add anything new. Specifically, through Article 10 it reiterated with almost the exact same wording the need for adaptation policies. To this end, it gave emphasis on the cooperation and exchanges between the developed and the developing nations, while also providing for some financial aid for extremely vulnerable states, in order for them to meet the costs of adaptation (Article12, paragraph 8) (United Nations 1997: 9, 12).

In the Paris Agreement the increased role of adaptation was clear; an upgrade that can be attested by the sheer number of times the word adaptation is mentioned, compared to the two previous treaties (47 compared to 4 in the UNFCCC and 5 in the Kyoto Protocol). As for the substantive aspects, Articles 4 through 6 focused on the co-benefits created for mitigation through integrated adaptation measures which could result in sinks for emissions. The most central-to-adaptation Article, however, was 7, by virtue of paragraph 1 of which states established "the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response…". Moreover, states should engage in adaptation processes and actions, inter alia, through formulating and implementing national adaptation plans (NAPs). Subsequent Articles, like number 9, moved in the same direction as those of the previous treaties, namely underlining the need for financial support and resource exchanges (United Nations 2015: 4-11).

### 2.2 The European context

The first steps of the EU towards a framework of adaptation were made in 2007 with the publication of a relevant Green Paper. The latter attempted to put adaptation action to the forefront by bringing out the importance and necessity of early action, based on climate data, the vulnerability of the European continent and estimations on economic losses. However, it did not contain but recommendations to the member states, such as the need for the involvement of both the private and the public sector (national, regional and local authorities), as well as the need to mainstream adaptation in sectoral policies. Specifically, in the case of the private sector it was highlighted that businesses, industry and services' sectors, as well as individual citizens could play an important role in adaptation measures. Also, as far as the public sector is concerned, specific items were brought out, like spatial and infrastructure planning, disaster management strategies, early flood and forest fire warning systems etc. With regard to the sectoral policies in which adaptation action should be taken, agriculture and rural development, energy, transport, water and health were mentioned among other things. Finally, the Green Paper emphasised the benefits of information-sharing between member states for reducing learning costs (Commission of the European Communities, 2007:9-20).

Two years later, in 2009, a relevant White Paper was published with the aim of systematising the EU's adaptation framework by setting two distinct and interrelated phases of work. During the first phase, between 2009 and 2012, a comprehensive adaptation strategy would be prepared; that would start being implemented in the second phase, i.e., from 2013 and onwards. Moreover, the Paper contained proposals covering the actions that needed to be taken in the first phase. These included the building of a knowledge base on the impacts of climate change for the EU, the integration of adaptation into EU key policy areas, and the employment of a multilevel approach with various solutions, like market-based instruments, guidelines, and public-private partnerships. Finally, there was a fourth component on the EU's external action regarding cooperation on adaptation at the international level (Commission of the European Communities 2009).

Following its timeline for implementation, the EU issued in April 2013 its first official Adaptation Strategy. In it, the varying responses of the member states to adaptation that far were described. Specifically, it listed that 15 states had already adopted a relevant national strategy, in some cases while also successfully integrating adaptation measures into sectoral policies, while some of the states that had not yet adopted their national strategies were preparing them. But, overall, adaptation was at a really early stage. To give it an impetus, the Commission listed a set of actions. The most important one was that it encouraged all member states to adopt comprehensive adaptation strategies, for which it provided guidelines. To better achieve that, it would develop an adaptation preparedness scoreboard, with key indicators for measuring the member states' readiness, and in 2017 it would assess the progress made. The other main key action points of the strategy referred to enhancing knowledge, financing adaptation projects, mainstreaming adapta-

tion action in specific EU policies, as well as improving resilience of targeted sectors like energy and transport (European Commission 2013).

No other major milestones regarding adaptation were introduced until the late 2010s, where the first relevant assessment was concluded by the EU in 2018. In the same year, the Governance Regulation of the Energy Union and Climate Action was adopted, which was of high importance for adaptation. The Regulation, inter alia, introduced the obligation for member states to formulate integrated national energy and climate plans, the famous NECPs, which have grown to become one of the cornerstones and roadmaps of the states' policy and action against climate change. The NECPs should take into account adaptation considerations overall, while specific adaptation measures should be also incorporated, according to the Regulation. Moreover, specific reporting obligations on adaptation for the EU member states were set by virtue of Article 19 (Official Journal of the European Union 2018).

A year later, in 2019, the EU announced the European Green Deal (EGD), a landmark development strategy with the aim of rendering Europe the first climate-neutral continent by 2050. The EGD predominantly focused on climate mitigation. Yet, in the relevant Communication, the European Commission highlighted that adaptation action should continue and be enhanced; hence, the EU would develop a new relevant strategy for better addressing its new ambitions and goals under the EGD (European Commission 2019:5).

Indeed, in 2021, the second official EU strategy on adaptation was published. Despite titled a "new" EU strategy on adaptation, the latest document did not bring any real innovations. Conversely, it advocated for a smarter, more systemic and faster adaptation, as, by then, all EU member states had a national adaptation strategy in place and implementation should be enhanced. Thus, it firstly reiterated the need for improving knowledge on adaptation, mainly through more and better climate-related risk and losses data. Secondly, it reemphasised the imperative of mainstreaming adaptation in sectoral policies, of involving different levels of governance, of including social justice considerations and, finally, of establishing robust monitoring, reporting and evaluation procedures. Thirdly, as far as the faster adaptation action was concerned, the strategy focused on the need of speeding up action overall, the need of climate-related risks reduction, mainly through the capitalisation of the broader disaster risk prevention and reduction nexus, as well as of the reduction of the climate protection gap. This meant decreasing the share of non-insured economic losses caused by climate-related disasters. The EU's relevant international action was also mentioned as an area of improvement (European Commission 2021).

The latest and probably most prominent development regarding the European framework on adaptation came through the European Climate Law, which was also adopted in 2021 and whose Article 5, paragraph 4 wrote: "Member States shall adopt and implement national adaptation strategies and plans, taking into consideration the Union strategy on adaptation to climate change… and based on robust climate change and vulnerability analyses, progress assessments and

indicators, and guided by the best available and most recent scientific evidence. In their national adaptation strategies, Member States shall take into account the particular vulnerability of the relevant sectors, inter alia, agriculture, and of water and food systems, as well as food security, and promote nature-based solutions and ecosystem-based adaptation. Member States shall regularly update the strategies…" (Official Journal of the European Union 2021: 11). Also, by virtue of Article 7, an assessment process for the national measures was established. Overall, through this article a clear shift of the EU towards a stricter adaptation framework can be observed. This is mainly demonstrated by the use of the verbs "shall" and of "adopt and implement", showcasing that the EU not only moved away from sheer recommendations, but also expected concrete results. In other words, it had now set out an obligation to adapt for the member states, which would be measured and monitored.

The article concluded with a promise from the EU's side, in order to assist member states in their newly-introduced obligation: the Commission would adopt guidelines for planning, developing, implementing and monitoring adaptation strategies and projects (Ibid). Indeed, in 2023 the guidelines were published. These were structured in 9 distinct but highly interrelated recommendations, 5 of which referred to matters of substance, while the remaining 4 related more to processes and means (European Union 2023:4).

From all the above, it becomes evident that both the international and the European framework on adaptation have been gradually becoming more robust over time, compared to their conception. Yet, they remain lenient, if not soft. The international one has managed to only establish adaptation as a global goal and make the development of NAPs the mainstream way of designing and implementing adaptation policies. The European one had not adequately paved the way to adaptation for years, limiting itself to issuing recommendations over recommendations. It only recently managed to establish adaptation as an obligation for member states, while also establishing, even more recently, comprehensive guidelines on what and how to do, not resembling in the least the strong and binding system it has developed for climate mitigation. Still, the progress made towards an in-depth assessment process for the measures taken at the national level by the member states must be acknowledged. Thus, even if there was a late(r) start, the climate adaptation regime seems to have started working, at least at the regional level. But how is all that applied in Greece?

## 3. The Greek response to adaptation

Greece's committed engagement and occupation with adaptation began in 2016, when in the aftermath of the Paris Agreement and the then newly-established global goal on adaptation, it adopted the Greek National Adaptation Strategy (GNAS). The latter's overarching goal, as stated in itself, was to contribute to the strengthening of the country's resilience to the impacts of climate change. To this end, it set five targets:

1. To systematise and improve the process of short- and long-term decision-making related to adaptation
2. To connect adaptation with the promotion of a sustainable development model through regional/local action plans
3. To promote adaptation actions and policies in all sectors of the Greek economy with emphasis on the most vulnerable ones
4. To create a mechanism for monitoring, evaluating and updating adaptation actions and policies
5. To strengthen the adaptive capacity of Greek society through information and awareness-raising actions

To best address the above and in one of the few cases of decentralised and bottom-up environmental policy making in Greece, the GNAS was set out to serve as a mere document of strategic orientation, aimed at setting guidelines for the development of 13 Regional Adaptation Strategies (RAS), one per Region of the country. As such, the GNAS did not decide upon the feasibility of specific adaptation actions, nor did it attempt to prioritise indicative solutions at either the sectoral or the regional/local levels. Instead, it included a first presentation of the vulnerability of 9 main sectors of the Greek economy as a whole with indicative measures for each, and of its 13 Regions. In the absence of official national data on the production per sector and Region, the GNAS drew data from a landmark report of the Bank of Greece (EMEKA 2011). Thus, it did only achieve the calculation of a relative vulnerability of the Regions, not categorising them based on their objective vulnerability to climate change, but only by comparison among them, taking also into account their projected economic losses per sector.

Furthermore, the GNAS underlined the necessity of guaranteeing the procedures for the preparation and institutionalisation of the RASs, particularly their content and specifications, as well as the processes of approving, implementing and monitoring them. Yet it once again made clear that the final selection, prioritisation and scheduling of appropriate actions and measures per Region would lie with them (Ministry of the Environment and Energy 2016:12,22). Finally, despite it being one of its 5 main goals, it failed to establish a monitoring and evaluation process and completely omitted it. The only reference made was under the means of implementation of the GNAS, specifically mentioning the usefulness of a potential observatory and a special mechanism for targeted support of adaptation efforts of all governance levels and actions through appropriate indicators and tools (Ibid:93).

Some months later, the Greek law 4414/2016 was passed which made official and legally binding the process of adopting the GNAS itself, its contents and process of update (Article 42). Specifically, the GNAS would be designed by the Ministry of the Environment and Energy (MEEN) and would be evaluated and updated at least every ten years, after an assessment analysis and following an opinion issued by the National Council on Climate Change Adaptation. The latter was established by virtue of the same law and was tasked, apart from the above, with advisory re-

sponsibilities, such as the specialisation of national adaptation policies based on international agreements and EU policies and the recommendation of relevant measures, even legislative actions (Article 44). Finally, Article 43 laid down the specifics for the creation of the 13 RASs, namely the process of their adoption by the 13 Greek Regions and minimum standards for public consultation, their minimum contents, as well as the process of their update, which should be done at least once every 7 years (Hellenic Republic 2016:8322).

The contents of the RASs were further elaborated by Ministerial Declaration 11258/2017. Maybe the most useful addition of the latter was that it introduced the obligation for Greek regions when designing their RASs to include the financing mechanisms, the possible additional sources of financing/cost coverage, the method of implementation, their estimated duration, as well as any implementation difficulties (Hellenic Republic 2017:7493).

As already showcased, the GNAS gave a high degree of autonomy to the Greek Regions for adopting their RASs, not laying down a specific timetable or deadline for that, neither for their implementation. This created great delays, leading to the first two RASs being adopted only in the first quarter of 2022. As of December 2024, 10 RASs had been adopted in total, while the remaining 3 have been further delayed with the traces of their impact assessments, whose design is a prerequisite for the adoption of the RAS, having gone missing for at least a year.

Table 1. Greek Regional Adaptation Strategies status of adoption

| Region | Status | Information |
|---|---|---|
| Attica | Adopted | 12/2022 |
| Central Greece | Adopted | 5/2023 |
| Central Macedonia | Adopted | 10/2022 |
| Crete | Adopted | 9/2022 |
| Eastern Macedonia and Thrace | Adopted | 11/2024 |
| Epirus | Adopted | 4/2022 |
| Ionian Islands | In progress | Impact assessment pending as of 6/2021 |
| North Aegean | Adopted | 4/2022 |
| Peloponnese | Adopted | 12/2022 |
| South Aegean | In progress | Impact assessment in public consultation as of 10/2023 |
| Thessaly | In progress | Impact assessment in public consultation as of 1/2024 |
| Western Greece | Adopted | 12/2022 |
| Western Macedonia | Adopted | 5/2023 |

**Source:** author's own compilation

Between the adoption of the GNAS in 2016 and the adoption of the first RASs in 2022, some more important developments occurred. Specifically, in December 2019, Greece adopted its first NECP fulfilling its obligation under the EU Governance Regulation (Decision 4/23.12.2019). In 2021, it established a Ministry of Climate Crisis and Civil Protection (MCCCP) (Presidential Decree 70/9.9.2021). Finally, in 2022 it adopted its own National Climate Law (NCL) (4936/2022).

As far as the NECP is concerned, despite it being a document of hundreds of pages, adaptation only occupied a few of them (less than 10). Therein, the necessity of adapting to climate change was reiterated. Also, the steps that the Greek state had already made regarding adaptation were presented, i.e. the adoption of the GNAS, the progress made by then for the adoption of the RASs, as well as some initiatives Greece had taken, like the implementation of a relevant LIFE project, co-funded by the EU, and a project in collaboration with UNESCO and the World Meteorological Organisation for the protection of cultural heritage from climate change. Thus, by again underlining the autonomy of the Greek Regions for designing their RASs, it avoided including any measures on adaptation (Hellenic Republic 2019:55554-55556).

By virtue of the aforementioned Decree, the newly-established MCCCP would oversee all "European matters and policies regarding climate change adaptation" (Hellenic Republic 2021). Subsequently, the Greek NCL explicitly tasked the said Ministry with the design and implementation of the GNAS reiterating a 10-year window before its update, while also setting a 5-year window for its evaluation. Apart from that, it also presented anew the specifications of the both the GNAS and the RASs. With regard to the latter, it specified that they should at least cover a 7-year period and set 5-year window for their evaluation too. Furthermore, it established the National Observatory on Climate Change Adaptation (Article 25). The latter was tasked, among other things, with the following:

1. monitoring and assessing the country's resilience to the impacts of climate change
2. providing data to the administration and training its executives to support the planning, evaluation and updating of policies and actions
3. developing and constantly updating a unified national climate database, building on existing national actions and initiatives, which will be digital and publicly accessible (Hellenic Republic 2022)

Before proceeding to the discussion of the implications of Greece's current response to adaptation, a final document needs to be examined. This is the newer version of the Greek NECP, which was designed for the fulfillment of the state's obligation for a mid-term update of its NECP under the EGD and the EU Governance Regulation. This updated version of the NECP is not yet in force, as it was put into public consultation from August to September 2024 and has not, since then, been officially adopted. This means that amendments may be done, especially taking into account that several of the comments submitted during the consultation referred to adaptation (OpenGov.gr 2024a). In any case, a preliminary note may be

taken: in contrast to the previous version, this one takes adaptation into far more consideration. Specifically, it presents a long list of measures which concern both natural and human systems and are designed based on vulnerability assessments for ecosystems, economic sectors and different population groups. Overall, these measures aim at reducing climate vulnerability for each of the pillars of the updated NECP. To better illustrate that, the measures are connected with specific sectors of climate mitigation and the synergies between and among them are also listed. Thus, an evidently more integrated approach for mitigation and adaptation is employed, which runs through the whole document (OpenGov.gr 2024b).

## 4. Discussion

From all the above, it became obvious that Greece has began its journey to climate change adaptation. However, some key shortcomings can be observed and a lot of food for thought can be offered. The main shortcomings have to do with delays. These have mainly been passed down by the international and European institutional framework itself, while others are completely of Greece's own fault and negligence. With regard to the food for thought, it has to do more with the governance mechanism that Greece has in place for adaptation. Thus, it might be relevant to policy makers for improving the national and regional adaptation policies, but it is also useful for further research. To delve deeper into all these considerations, it is useful to attempt a first assessment of the efficiency of Greece's adaptation policy. This can be performed by looking into whether or not it follows the relevant guidelines of the EU for adaptation strategies (see European Union 2023:4).

Greece seems to be "ticking the box" of the first two guidelines which write that member states should have "legal frameworks laying down the 'duty to adapt' at national level, including binding, regularly updated (sectoral) adaptation goals to measure overall progress in building resilience to climate change impacts"; and that they should also have "regularly updated adaptation strategies and plans in place, framing the overall adaptation policy and its implementation at strategic and operational levels". Having passed its GNAS through law since 2016, Greece indeed seems to have legally established its duty to adapt. Also, by virtue of its latest legal acts, especially its NCL, it has established a system for regularly updating its adaptation goals. It is reminded that the GNAS may be updated every 10 years, while the RASs every 7, with the window of assessment of both having been set to 5 years. These timelines, if observed, ensure a regular update. However, it remains to be seen whether or not this will be indeed done on time. Taking into account, though, that the GNAS was adopted in 2016, it is a great opportunity for Greece to start early its update which would be due in 2026.

The third guideline refers to "adaptation policy priorities identifying sectors or areas to be involved and covered by adaptation planning and impacts or risks that need to be addressed in adaptation planning. The priorities should be set out in order of targets and objectives, followed by clear adaptation pathways

setting up the process of how to achieve them through the sequence of options and actions". Greece suffers in this regard. Although the GNAS set out the policy priorities and most vulnerable sectors for adaptation, it is reminded that it approached vulnerability only in relative terms. This means that a great deal of work needs to be done to identify anew vulnerable sectors and areas and to design adequate indexes and datasets, in order to make more informed and science-based decisions regarding adaptation, especially at the regional level.

Fortunately, circumstances may favour this conundrum. It is true that even when the GNAS was designed, the data on which it drew, coming from the 2011 report of the Bank of Greece, could have already been outdated. Let us not forget here, that the 2010s was a really intense decade in terms of climate policy making globally and especially in the EU. Thus, new data and approaches constantly kept coming. Let us not forget either that the climate data for the past decade have been really revealing and alarming. A new assessment cycle of the Intergovernmental Panel on Climate Change has been concluded; hence Greece could capitalise on all this new knowledge. By the same token, the Bank of Greece has been preparing a new report titled "Climate change vulnerability and impacts in Greece", whose interim results were presented in November 2023 (Bank of Greece 2023). Hopefully, the final report will be published soon, in order for the process of updating the GNAS to feed on it.

The above will also serve for fulfilling the fourth guideline at the national level, namely the existence of "regularly updated and robust climate change impact and vulnerability assessments based on the latest climate science to identify the populations, essential infrastructure and sectors particularly vulnerable to climate change, setting the overall strategic direction of adaptation policy and continuously informing decision-making". For the regional level, this seems to be covered already as impact assessments are a prerequisite for Greek Regions to adopt their RASs. And as portrayed in Table 1 above, the 3 RASs that have not yet been adopted are stuck at the phase of approving those assessments. Yet, caution is needed here: the RASs were practically outside the scope of this study, so their robustness has not been checked.

The same applies to guideline number 5, which concerns "stress testing of (critical) infrastructure and systems as a key input into climate change risk assessments". Again, the RASs were not examined, but with a brief search one may find, for instance, that the Region of Attica has been implementing actions to this direction. It has already installed and tested a pilot system for floods in the Municipality of Peristeri, one of the top-3 most densely populated municipalities in Attica, and another one for early flood warning in the Phylis Municipality. Also, it recently established its own observatory on climate change (Region of Attica, 2024). This is not to say that Greece and its Regions do or do not follow this guideline or not; rather that Regions that do not implement such actions should start doing so and, in a similar vein, the central government itself where appropriate.

The conversation on pilot systems and observatories is a perfect bridge to the sixth guideline, according to which there is need for "sufficient, knowledgeable personnel and financial resources across all related institutions and administrative departments for the coordination of activities and implementation of actions at all levels of governance (national, regional, local)". In regard with the knowledge aspect, Greece again is lagging behind. The most striking example concerns the National Observatory on Climate Change Adaptation which was established by the Greek NCL in 2022, having been proposed as early as 2016 in the GNAS. It is reminded that the Observatory was, inter alia, tasked with providing data to the administration and training its executives to best address adaptation needs and action. Apart from the fact that it took Greece 6 years to establish it, it has been another 2.5 years since the NCL entered into force and the Observatory has not been equipped with staff yet, let alone start functioning. And this creates a huge knowledge gap. The only knowledge-related step that has been made up to today concerns the digital climate database that the Observatory would oversee. In November 2024, the Academy of Athens and the Natural Environment and Climate Change Agency announced their collaboration with the MEEN for a 20-months project on the creation of the said national database (Money Review 2024), which means that, at best, this will be ready by mid-2026.

As far as the financing aspect of the guideline is concerned, further research is needed for both the national and the regional level to argue about that. However, taking into account the fact that the 2017 Decision that elaborated the specifications of the RASs set an obligation of listing therein a financial plan, examining the soundness of the adopted RASs' said plans would be a good start.

Further research would also be needed to argue about guideline 7 as well, regarding the "engagement of all relevant stakeholders (private sector, NGOs, certain communities, etc.) that are particularly exposed / vulnerable and / or have knowledge / resources / capacities to inform and / or implement the adaptation actions". The RASs should again be looked into, insofar this guideline refers to the implementation aspect, which is practically carried out through the 13 Greek Regions. With regard to the GNAS, this guideline will be relevant for its imminent update.

The penultimate guideline refers to the need of "multi-level coordination and mainstreaming, both horizontal (e.g., across the ministries) and vertical (e.g., with other layers of public administration), when planning and implementing adaptation actions". Here, it is once again stated that adaptation is practically carried out by the 13 Greek Regions. Also, it is reminded that, up until 2022, adaptation responsibilities were under the MEEN and they were passed on to the newly-established MCCCP with the Greek NCL. Finally, what was not mentioned earlier is that, by virtue of Article 16 of the latter, an obligation for municipalities to design and implement Municipal Plans for Emissions Mitigation was introduced. All these are mentioned because they create a somewhat fragmented governance system, where mitigation is overseen by the MEEN and is implemented at the

local level by Municipalities, whereas adaptation is overseen by the MCCCP and is implemented at the regional level by the Regions. This may seem like the perfect embodiment of the guideline with both a horizontal and vertical allocation of competences. Besides, this has been a cornerstone of the EU adaptation framework since its inception. As early as 2007, the EU's Green Paper was mentioning that "division of competence between states and their regions varies significantly across the EU… [and therefore there should be an adjustment] …to the national situation" (Commission of the European Communities 2007:11).

Nonetheless, some concerns need to be raised regarding the attainment of coordination, in the sense that, with such a governance mechanism, it becomes really challenging. This is especially relevant taking into account the need for an integrated approach and the creation of synergies between mitigation and adaptation in order to deliver co-benefits. This approach requires not only exchanges between the central government, i.e. the two Ministries, and the Regions and Municipalities, but also between the two levels of local authorities. And this might prove to be complex.

Rethinking its approach soon could be a viable solution for Greece, for instance by establishing an obligation for Regional Plans for Emissions Mitigation, also in line with the sectoral carbon budgets recently established at the national level. As of mid-2024, the Greek Municipalities had not yet fulfilled their obligations, despite the extension of the respective deadline they had been granted. Specifically, the Greek Minister of Environment and Energy, answering a relevant parliamentary question, had said that "[a]ccording to the information we have, several Municipalities are in the process of preparing their Plans and are expected to submit them in the Electronic Database by the end of the year" (MEEN 2024). Yet as of early 2025, none of the 332 Municipalities had done so. This means that a huge load of administrative burden would be lifted before Municipalities eventually start submitting their Plans. In any case, decision makers should first examine the efficiency of this mechanism, before examining the possibility of changing this division of competence. In the event that such a possibility is considered, looking into the governance mechanisms of other EU member states by way of best practices would be necessary.

The ninth and final guideline refers to the "continuous monitoring and evaluation of implementation of adaptation actions, covering processes as well as effects and outcomes, and endowed with the necessary instruments. Infrastructure for the monitoring of adaptation outcomes may have important synergies with early warning". And this is where Greece has proven to be the least adept. A first sign for this is the absence of the aforementioned Observatory and the delays surrounding it, as described above, whose function would have contributed a lot in this direction.

Other concerns in this regard are related to the compliance aspect of a monitoring system. Specifically, it can be argued that even as this article is being written, adaptation has remained a dead letter since the GNAS's adoption, as

adaptation is practically carried out by the Regions and only some of them have adopted their RASs. This stands out even more taking also into account the fact that adoption does not necessarily automatically means implementation. In other words, even the Regions that have adopted an RAS may have not started implementing it yet. All this brings out the need for the establishment of a robust national monitoring system with compliance standards and penalties. Such a need becomes even more dire if one thinks of the recent disasters Greece has experienced. Ironically enough, Thessaly which was hit by Storm Daniel still does not have an RAS in place, whereas Eastern Macedonia and Thrace which withstood the megafires in 2023 adopted its own RAS only in November 2024. Of course, this is not to claim that the adoption or even implementation of RASs would have averted the natural disasters. However, a higher level of preparedness could have mitigated the losses, the economic ones included, for instance, through early warning systems and nature-based solutions.

## 5. Conclusions

Greece has, in the past few years, experienced some of its most serious natural disasters, a fact that, on the one hand, brings out the imperative for the state to better adapt and prepare and, on the other, the need to engage in relevant research. With this in mind, this article aimed to identify the extent to which Greece has developed its adaptation policy framework and whether or not that is efficient. In other words, to give an overview of the state's compliance with the institutional and legal framework it has set, and to perform an evaluation of the latter.

With regard to the first question, it was found that Greece indeed has developed its policy framework. It has adopted its GNAS and 10 out of its 13 Regions have adopted their RASs. But this development remains to a medium extent. And this is not because Greece has not conceived an adequate strategy, but because it has not made as much progress as expected in the implementation aspect. In other words, a lot of things remain in paper and are absent in practice. The most indicative example in this regard is the fact that there is a complete absence of monitoring bodies and procedures both for the national level and for regional one. The National Observatory on Climate Change Adaptation which was provided for in Greece's NCL and would serve as such, has not yet been launched. And this also leaves a significant knowledge gap for the administration, as well as a potential gap in its obligations towards the EU. Let us not forget at this point that by virtue of the ECL robust reporting processes were set up. And this absence of monitoring may prove to be critical in this case too.

As far as the second question is concerned, the efficiency, this far, can also be characterised as mediocre at best. And this is not necessarily due to Greece's performance, but also because a lot of the parameters that would determine such a performance were, eventually, outside of the scope of this study. Specifically, the biggest shortcoming identified in terms of efficiency is the complete and

utter absence of compliance mechanisms in the state's adaptation scheme. This absence has led to tremendous delays in the adoption of the Region's RASs, which, if in place, maybe could have watered down the losses that the aforementioned disasters incurred. In terms of efficiency, concerns are also raised by the fragmented governance mechanism that Greece has created, following a potentially incohesive division of competences among Ministries and local authorities for climate mitigation and adaptation. A governance mechanism that, in other words, might prove to be complex in practice. Yet, this remains to be seen.

As the period for updating its GNAS is fast approaching, Greece needs to engage in a self-reflecting exercise. It needs to identify which aspects of the implementation to speed up and why, to take stock of the current shortcomings, like the absence of compliance mechanisms and the overall delays, as well as to perform an overall evaluation of its adaptation mechanism and examine alternatives (e.g. with regard to the competences). Also, since the EU has provided the member states with such elaborate guidelines Greece should also make good use of them when designing the next phase of its strategy.

On a final note, it has to be mentioned that Greece seems to be following, at least at a minimum level, the relevant EU's guidelines on adaptation. However, to further determine that, equally further research is needed. Due to the division of competences that it has chosen, leaving the actualisation of adaptation to its Regions, a lot of the "dos and don'ts" of the EU do not refer to the central government and its planning, which was assessed here, but to the Regions themselves. Thus, the next step, research-wise, would now be to study if and how the Greek Regions have started implementing their RAS.

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# Conflicting policies threatening the sustainability of Greece's electricity model: short history and lessons learnt

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## Abtsract

The four Institutions involved in Greece's economic rescue programs, insisted on the partial privatization of Public Power Corporation's (PPC) lignite portfolio based on a case that was initiated 20 years ago when the economic realities of lignite were vastly different. This paper criticizes the European Commission on its persistence to enforce such one-dimensional approaches, while contradicting even the EU's own climate policies. It further highlights the role of environmental NGOs and think tanks, which, together with key developments in EU legislation prevented a structural lock-in to lignite and paved the way for the decision to phase out lignite by 2028.

**Keywords:** Lignite, antitrust, NGOs, EU policy, ETS

# Αντιφατικές πολιτικές που απειλούν τη βιωσιμότητα του ελληνικού μοντέλου ηλεκτρικής ενέργειας: σύντομο ιστορικό και διδάγματα

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## Περίληψη

Τα τέσσερα θεσμικά όργανα (η Ευρωπαϊκή Επιτροπή, η Ευρωπαϊκή Κεντρική Τράπεζα, ο Ευρωπαϊκός Μηχανισμός Σταθερότητας και το Διεθνές Νομισματικό Ταμείο) που συμμετείχαν στα προγράμματα οικονομικής διάσωσης της Ελλάδας, επέμειναν στη μερική ιδιωτικοποίηση του χαρτοφυλακίου λιγνίτη της ΔΕΗ με βάση μια υπόθεση που ξεκίνησε πριν από 20 χρόνια, όταν οι οικονομικές συνθήκες για το λιγνίτη ήταν πολύ διαφορετικές. Το άρθρο αυτό επικρίνει την Ευρωπαϊκή Επιτροπή για την επιμονή της να επιβάλλει μονοδιάστατες προσεγγίσεις, οι οποίες δεν συνάδουν με τις πολιτικές της ΕΕ για το κλίμα. Υπογραμμίζει περαιτέρω τον ρόλο των περιβαλλοντικών ΜΚΟ και δεξαμενών σκέψης οι οποίες, μαζί με τις βασικές εξελίξεις στη νομοθεσία της ΕΕ απέτρεψαν την παραμονή στο λιγνίτη και άνοιξαν το δρόμο για την απόφαση απολιγνιτοποίησης έως το 2028.

**Λέξεις κλειδιά:** Λιγνίτης, αντιμονοπωλιακή πολιτική, ΜΚΟ, Ευρωπαϊκή πολιτική, Σύστημα εμπορεύσιμων εκπομπών

## 1. Introduction

In 2019, Greece became the first member state of the European Union (EU) utilizing lignite (brown coal) for electricity production to announce that it would phase out lignite prior to 2030 (Mitsotakis, 2019). However, this decision and the actual decline of lignite use in Greece recorded in recent years, were far from guaranteed, due to conflicting factors influencing the evolution of Greece's energy policy. On the one hand, developments in EU's climate and energy policy combined with the advocacy efforts by environmental NGOs and thinks tanks in Greece and the EU were contributing towards the decline of lignite use. On the other hand, EU's policy associated with Greece's economic rescue program and the failure of Greece's political leaders to appreciate the dead-end for coal in Europe, were effectively pushing in the opposite direction, towards the prolongation of the lignite-based electricity model.

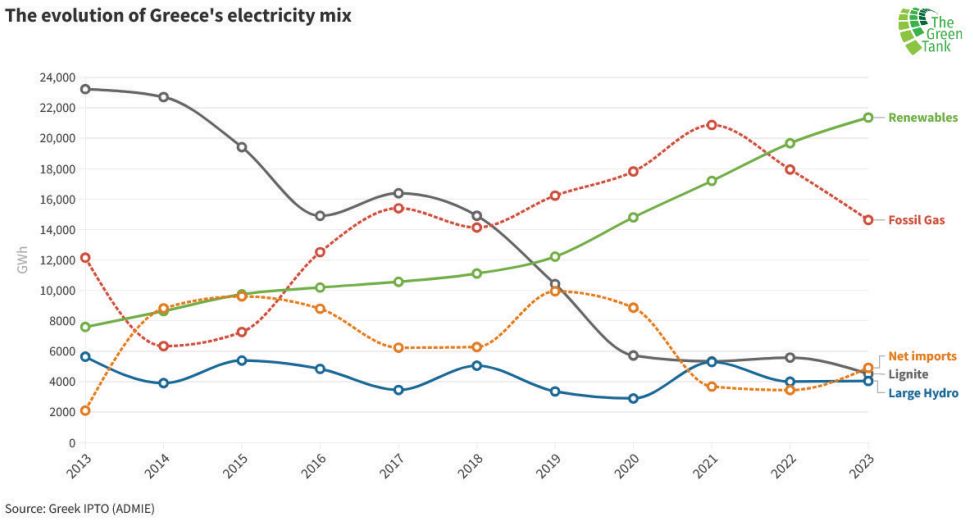
In the following, we will present and analyze the complex interplay between these contradicting factors. Three key EU policy developments which contributed to a decrease in lignite use in Greece will be presented first, followed by a discussion on the Greek Public Power Corporation's (PPC) antitrust case aiming at providing access to Greece's lignite deposits to companies other than PPC. Emphasis will be placed on the persistence of the Institutions responsible for Greece's economic rescue program (the European Commission, the European Central Bank, the European Stability Mechanism, and the International Monetary Fund) to enforce the decision on the antitrust case, years after the case was first brought to the European Courts, at a time when lignite economics had drastically deteriorated. Throughout the analysis of these different policy and legal facets, the positions and specific actions of environmental non-governmental organizations (NGOs) and think tanks in Greece and the EU will be presented and discussed. We conclude with a critical assessment of Greece's case which could help policy and decision makers avoid similar threatening situations in the future.

## 2. The role of lignite in Greece

Lignite has been the dominant fuel in Greece's electricity mix since the 1950s. Lignite extraction and combustion to produce electricity is exclusively controlled by the Public Power Corporation (PPC), Greece's largest company. The share of lignite in covering electricity demand reached as high as 78% in 1993 (Vassos &Vlachou, 1997). Since 2013, however, it started to decline and in 2019 surrendered for the first time the top spot in Greece's electricity mix to fossil gas, which retained it for three consecutive years, before losing it to renewables in 2022 (Figure 1). That same year lignite covered just 11% of demand, producing 5.58 TWh, one fifth of its output ten years ago and a mere 0.24 TWh more than its up until then historic low recorded in 2021 (5.34 TWh). In 2023, due to the acceler-

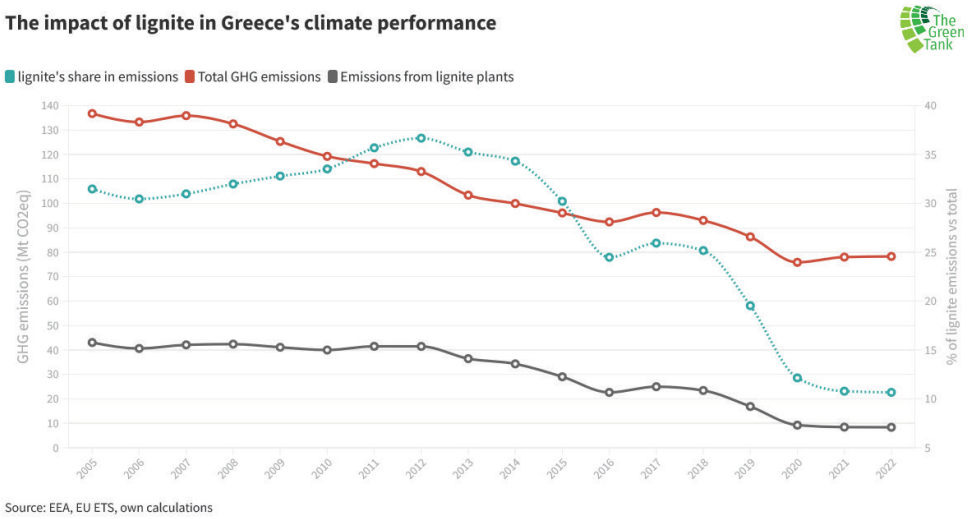
ation in the deployment of renewables, a new historic low was recorded for lignite (4.51 TWh), which was also accompanied by a drop of fossil gas-based electricity generation back to 2018 levels.

Figure 1: The evolution of Greece's electricity mix. Source: Greece's Independent Power Transmission Operator (The Green Tank, 2024)




Carbon dioxide ($CO_2$) emissions from lignite plants contributed the most in Greece's total greenhouse gas (GHG) emissions throughout the years. Since the EU's Emissions Trading System (EU ETS) began to operate in 2005 and cumulatively, until the end of its third phase in 2020, emissions from Greece's lignite plants accounted for over 30% of the country's overall GHG emissions, one of the largest such shares in the EU. Hence, the recently (after 2019) accelerated drop of lignite use and its substitution by renewables and the less polluting fossil gas, has benefited Greece's climate performance profoundly. Lignite's share in the total GHG emissions dropped to 10.7% in 2022 (Figure 2) from 31.5% in 2005. That same year Greece recorded a 28.4% decrease in net GHG emissions compared to 1990 levels, four percent below the EU average (-32.5%), whereas in the past Greece had been consistently one of the laggards in the EU with respect to its climate performance.

Figure 2: The impact of lignite in Greece's climate performance. Red: Total greenhouse gas (GHG) emissions; black: GHG emissions from Greece's lignite plants; light blue: the share of the total GHG emissions that come from lignite plants. (EEA, 2024; EU ETS Union Registry, 2024; and own calculations).




## 3. European Policy Developments

The 2015 Paris Agreement was a turning point in international climate policy. Although the phase out of fossil fuels was not explicitly mentioned in the agreement's text (United Nations, 2015), the focus on limiting the global temperature rise to 1.5oC and the introduction of the climate neutrality goal, were enough to mobilize the EU. Limiting the use of coal, the most polluting of all fossil fuels, became a priority in the EU's climate and energy policy. The revision of three major EU files after the Paris Agreement can be considered as milestones: the EU ETS Directive (European Parliament & the Council, 2018), the new Best Available Techniques conclusions (BATc) (European Commission, 2017) associated with the EU Industrial Emissions Directive (IED) (European Parliament & the Council, 2010) and the recast Electricity Market Regulation (EMR) (European Parliament & the Council, 2019).

### 3.1 The EU Emissions Trading System

The carbon price directly burdens the operating costs of lignite plants. Its value, which is the cost for purchasing a single emission allowance equivalent to one

tonne of $CO_2$, is largely determined by the rules set in the EU ETS directive. The 2015-2018 revision of this Directive led to an explosion of the carbon prices starting in the second half of 2018, which in turn had a profound impact on the economics of the coal industry across the EU.

Specifically, it was during this revision that the EU agreed on a higher climate ambition for the fourth EU ETS phase (2021-2030) and an emissions reduction target of 43% by 2030 compared to 2005 levels (European Parliament & the Council, 2018). More importantly, the EU established the so-called "Market Stability Reserve" (European Parliament & the Council, 2015), a mechanism of removing excess emission allowances from the carbon market, thus stimulating the price signal through reducing their availability. As a result of these changes, the carbon price, which was hovering around 4-8.5 €/t between 2013 and early 2018, skyrocketed to 25 €/t by the end of 2019, surpassed 33 €/t in 2020 and more than doubled in 2021 to reach the 70 €/t milestone for the first time. The Greek lignite industry was hit more profoundly than the rest of the EU, since Greek lignite plants emit more $CO_2$ per unit of electricity produced compared to plants in other member states. Therefore, Greek lignite plants are more vulnerable to high carbon prices.

Instead of realizing the financial catastrophe that was ensuing for the Greek lignite industry, PPC, the owner of all lignite assets in Greece, tried to bypass them. Throughout the revision negotiations, PPC actively sought to obtain a derogation of Article 10c in the EU ETS Directive, which would offer free emission allowances to its lignite plants. The overwhelming majority of Greek Members of the European Parliament (MEP) from all political groups supported this position in all committees as well as in the plenary of the European Parliament (European Parliament, 2017). The same was also true for the Greek government up until the final vote in the EP plenary in February 2017, after which it abandoned this quest in the Council and focused only on rendering Greece eligible for access to a newly formed ETS fund, namely the Modernisation Fund (Famellos, 2017). In addition, Greece advocated in favor of rendering retrofits of lignite plants eligible for funding from the Modernisation Fund, a position that was reflected in the Council's general approach (Environment Council, 2017).

Environmental NGOs in Greece and the EU were also actively engaged in the legislative process, fiercely opposing both efforts. They argued that if Greece were granted the derogation, then a huge share of public revenue from the auctioning of these allowances would be lost on a polluting industry, when it could be used to support the shift of Greece's energy model towards energy efficiency and clean energy as well as the Just Transition of Greece's lignite regions (Mantzaris, 2017). They also brought to light that these free emission allowances were essential for PPC to build two new lignite plants (Ptolemaida 5 and Meliti 2) (Neslen, 2016). By highlighting the public admission of PPC's CEO at the time that the two new lignite plants would not be economically viable without these free emission allowances (Panagiotakis, 2016), they further explained to decision makers in Brussels that PPC's plan contradicts the very scope and spirit of the EU ETS Directive.

In addition, environmental NGOs advocated against the use of the newly established Modernisation Fund for retrofits of hard coal and lignite plants. They argued that the limited amount of funds available for the modernization of the energy systems in the eligible financially weaker member states should be used for developing clean energy infrastructure, instead of investing to prolong coal plants' lifetime. At a time when the financially stronger member states were massively turning to renewables, rendering the coal industry in the financially weaker member states eligible for funding from the Modernisation Fund would widen the energy policy gap within the EU.

In the end, the eligibility criteria for obtaining an Article 10c derogation, remained as in the original EC proposal: only member states with a GDP per capita below 60% of the EU average in 2013 could make use of this derogation (European Parliament & the Council, 2018). Since Greece was above this threshold, it was not eligible to use part of the public revenue from ETS auctioning to subsidize the operation of its lignite plants. Moreover, EU decision makers excluded all investments in solid fossil fuel infrastructure from the Modernisation Fund, except for Combined Heat and Power (CHP) plants in Bulgaria and Romania.

Hence, the conclusion of the EU ETS reform in late 2017 meant that the Greek lignite industry would neither have free emission allowances to subsidize the operation of its lignite plants nor any funds to finance the expensive retrofits that Greek plants needed to undergo to comply with the IED and the accompanying BATc, which were also under revision.

### 3.2 The Best Available Techniques conclusions (BATc)

While the EU ETS Directive was being reformed, the process of updating the emission limit values for pollutants emitted by large combustion plants (sulfur dioxide, nitric oxides, dust, heavy metals etc.) was also approaching its conclusion. According to the IED (European Parliament & the Council, 2010), large combustion plants, including coal plants, would have to implement abatement techniques to comply with the new emission limit values set in the so-called "Best Available Techniques conclusions" (BATc) (European Commission, 2017), at the latest four years after the formal adoption of the corresponding document.

As the vote for the BATc was approaching, negotiations on the EU ETS Directive were tilting towards excluding funding for coal plant retrofits through the Modernisation Fund. Thus, the financial impact of the upcoming BATc vote would be even more profound. Environmental NGOs from Greece and the EU were actively advocating in favor of adopting the BATc with the stricter emission limit values. Their arguments were based on the well-documented environmental and health costs associated with the severe air pollution stemming from the operation of the lignite plants (EEB et al. 2016). On the contrary, the severe impact that the adoption of the document would have on the economics of coal plants across the EU led almost all coal producing member states to vote against it in April 2017. Greece was the only exception as it voted in favor of the BATc. The Greek government's vote was a result

of the gradual realization that there was no future in Greece's lignite industry and coincided with the abovementioned failure to obtain free emission allowances for Greece's lignite plants in the EU ETS Directive revision. With a share of the vote of 2.11%, Greece's positive vote was essential to barely lift the overall majority 0.14% above the 65% threshold, required for approval (European Council, 2017) and lead to its adoption (European Commission, 2017).

As a result, Greek lignite plants would have to undergo expensive retrofits to comply with the new emission limit values, at the latest, four years after the official publication of BATc without, however, any form of state aid or funding from the Modernisation Fund.

### 3.3 The Electricity Market Regulation

At the same time as the above developments, the Electricity Market Regulation was also being revised as part of the EU's "Clean Energy for all Europeans" package. Among other issues, the EMR regulates subsidies to power plants through their participation in the so-called "capacity mechanisms". From 1998 until 2018, these mechanisms had subsidized coal plants with approximately €39 billion paid by electricity consumers across the EU (Mang, 2018).

With its 2016 proposal for a revision of the EMR, the EC was determined to terminate subsidies towards coal and lignite plants through capacity mechanisms (European Commission, 2016). The EC set an emission performance standard of 550 gr $CO_2$/KWh as an eligibility criterion for plants to participate in capacity mechanisms. This standard effectively excluded all hard coal and lignite power plants.

During the negotiations Greece joined forces with Poland and managed to persuade the Council to adopt a drastically different position ahead of the trilogue negotiations (Verroiopoulos, 2017). Specifically, the Council's general approach proposed amending the EC's original proposal to: a) prolong the period during which existing plants could be subsidized through capacity mechanisms until 2035 and b) render new lignite plants, such as PPC's new lignite plant "Ptolemaida 5", eligible for participation in capacity mechanisms (Council of the European Union, 2017).

On the other hand, environmental NGOs in Greece and the EU strongly supported the original proposal by the EC to exclude all coal plants from capacity mechanisms (CAN, 2017) and advocated in favor of this position throughout the negotiations (Flisowska, 2018).

In the end, the recast EMR provided that no new coal plant could participate in any capacity mechanism and no existing coal plant could receive subsidies through a capacity mechanism beyond June 2025 (European Parliament & the Council, 2019). However, the agreement on the recast EMR contained a loophole: plants emitting above the 550 gr $CO_2$/KWh threshold (i.e., coal plants) could receive capacity payments, provided they participated in capacity mechanisms that were approved prior to the day the Regulation came into force (July 4,

2019), and the corresponding contracts were signed before the end of 2019. This "grandfathering" clause left a window of opportunity for the Greek lignite industry to subsidize existing lignite plants through capacity mechanisms beyond 2025, as well as the new plant "Ptolemaida 5", provided Greece had a capacity mechanism in place before July 4, 2019.

## 4. The antitrust case

The three abovementioned post-Paris Agreement developments in EU climate and energy policy were clearly signaling against the prolongation of the coal-based electricity model across the EU. However, for Greece, these were not the only signals received. A long-standing anti-trust case against the PPC's monopoly in the exploitation of lignite threatened to keep Greece locked-in to lignite for the foreseeable future. This threat was in full display in the draft National Energy and Climate Plan (NECP) the Greek government submitted for public consultation in November 2018 (Ministry of Environment and Energy, 2018), that is at the end of the negotiations of the ETS, BATCs and EMR. Therein, the participation of lignite in Greece's electricity mix was extended until at least 2040.

### 4.1 Legal basis

This antitrust case began in 2003 when the European Commission received a private complaint alleging that the exclusive license to explore and exploit lignite granted to PPC with a 1959 legislative decree and the 1973 mining code, was contrary to the EU market rules.

Responding to this complaint in 2008, the EC found that the exclusive rights on lignite enabled PPC to maintain or strengthen its dominant position in the wholesale electricity supply market by blocking any new entry into the market to the detriment of Greek consumers (European Commission, 2008). Consequently, the EC laid down specific measures to remedy the anti-competitive effects of the infringement and pushed for the opening of the Greek lignite market to competition (European Commission, 2009).

PPC, supported by the Greek government, filed two appeals with the General Court of the European Union (GCEU) and requested the annulment of the EC's two decisions. However, the GCEU with its final decision (GCEU, 2016), 13 years after the initial complaint, rejected all arguments raised by PPC, thus obligating Greece to render lignite deposits accessible to other companies besides PPC. In the meantime, the economic prospects of lignite plants had drastically deteriorated and the 2015 Paris Climate Agreement was already leading the EU to major policy revisions.

In parallel, Greece was faced with an unprecedented financial crisis and had been subject to an economic adjustment program, supervised by the country's main lenders, represented by the EC, the European Central Bank, the European Stability Mechanism, and the International Monetary Fund, henceforth "the Institutions".

### 4.2 The first privatization attempt – "small PPC"

The first attempt by the Institutions to impose the unbundling of PPC's lignite assets came in 2012 before the final General Court's decision. The second economic adjustment program for Greece specifies that "the Greek government has now committed to grant access to 40 percent of lignite capacity to the incumbent's competitors by end-March 2012 and it has put forward the idea of selling hydro plants, which could be combined with the sale of lignite plants" (European Commission, 2012).

This plan started to materialize two years later when the law of "small PPC" was approved by the Greek Parliament (Greek Government, 2014). The law established a new vertically integrated power company to which 30% of PPC's total electricity producing capacity and 30% of PPC's clients would be sold.

Reactions to the law by all opposing parties in the Greek Parliament echoed their positions against the privatization of the PPC and other Greek assets, as well as most measures imposed to Greece by the Institutions. Environmental NGOs opposed this law as well, albeit for a completely different reason. The sale of lignite assets to private companies would prolong the lignite-based electricity model in Greece, at the detriment of climate, nature, public health and the economy.

The law for "small PPC" was finally adopted but was never implemented because of the shift in power after the national elections in January 2015. The new government formed by left party SYRIZA was against privatizing any part of PPC, including its lignite assets.

### 4.3 The second privatization attempt

The second and more threatening attempt to enforce the implementation of the EU Court's antitrust decision regarding PPC's lignite monopoly came almost three years later. In 2017, the Institutions formulated a Supplemental Memorandum of Understanding (European Commission et al, 2017) which included nine structural measures in the energy sector. Their intention was "to bring Greek energy markets in line with EU legislation and policies, make them more modern and competitive, reduce monopolistic rents and inefficiencies, promote innovation, favour a wider adoption of renewable energy and gas, and ensure the transfer of benefits of all these changes to consumers". The cornerstone of these measures was the divestment of 40% of PPC's lignite-fired generation capacity and related assets to existing or new alternative suppliers and other investors.

After Greece agreed to the sMoU intense negotiations on the contents of the lignite sale "package" between the Greek government and the European Commission followed. The EC's willpower prevailed (European Commission, 2018). Thus, in April 2018 the Greek Parliament voted Law 4533/2018 (Greek Government, 2018), describing the assets to be sold, the procedures that would be followed and associated measures. Setting aside differences and objections on specific articles of Law 4533/2018, the three biggest political parties in Greece supported

the lignite sale in principle, because they understood that the sale would ensure the continuation of the lignite-based electricity model. The Greek communist party was the only one opposing the lignite sale. However, its position stemmed from its general opposition against all privatizations of public assets.

Environmental NGOs and think tanks in Greece, as well as ClientEarth, a London-based organization of environmental lawyers, on the other hand, strongly opposed the overall concept of selling a portion of PPC's lignite assets to other power companies (Mantzaris, 2018; Holmes & Diamantopoulou, 2019). They addressed the very core of the Institutions' rationale which assumed that breaking the PPC's monopolistic access to the country's lignite deposits, would increase the competitiveness in the electricity market, and, consequently, lead to lower electricity prices for the benefit of the consumers and the Greek economy. They argued that the imposed sale would have the completely opposite effect as it would extend lignite's role in Greece's electricity mix, which would, in turn, have catastrophic effects for the consumers, PPC, and the Greek economy for a variety of reasons.

First, the revision of the EU ETS Directive aimed at stimulating the carbon price signals and salvage the EU's flagship climate mitigation policy instrument. Since the Greek lignite plants burn the worst quality lignite in the EU, they emit the most $CO_2$ per unit of electricity produced. Thus, they would be more vulnerable economically to major carbon price increases, directly burdening the operating costs of lignite plants. Second, the EU's new BATc rules on pollution from power plants that were agreed upon at the EU level in April 2017 required expensive retrofits for the highly polluting lignite plants, thus further deteriorating the economics of lignite plants. Third, conventional fossil fuel electricity generation technologies were already facing significant competition from renewables, that were becoming progressively cheaper.

The aforementioned arguments were presented in two letters sent by the networks of environmental organizations "Europe Beyond Coal" and "Climate Action Network Europe", the organization of environmental lawyers, ClientEarth, the British climate think tank, Sandbag and the Greek environmental think tank, "The Green Tank", to the Commissioners for Climate Change and Energy (EBC et al., 2019a) and Competition (EBC et al., 2019b). Interestingly, Commissioner Cañete replied that the objective of the lignite divestiture "by no means entail the construction of new coal power plants (Meliti 2) or the extension of the licenses of the existing ones" (Cañete, 2019), while Commissioner Vestager emphasized "that none of the investors has shown interest in the construction of such a unit" (Vestager, 2019). Following these answers, the NGOs requested from both Commissioners to modify the Sales Purchase Agreement (SPA) by removing the production license for Meliti 2 and ensuring that the two lignite plants in Megalopoli as well as Meliti 1 included in the package would be retired by 2027 and 2028, respectively, when their environmental permits expired. It was the first time that 2028 was mentioned as a possible end of the lignite activity related to the three plants that were up for sale (EBC et al., 2019c). Eventually 2028 was adopted by the Greek Prime Minister as the phase out year for lignite (Mitsotakis, 2019).

### 4.4 The Greek capacity mechanism

The deteriorating economics of Greek lignite plants was a major obstacle impeding the lignite sale. To remedy this, PPC and the Greek government engaged into intense efforts to subsidize the Greek lignite plants via a capacity mechanism.

After the outcome of the trilogue negotiations on the recast EMR in December 2018 and the failure to ensure long-term financial support for Greece's lignite plants, the government's strategy shifted towards exploiting the abovementioned "grandfathering" loophole in the EMR to exempt Greek lignite plants and make them eligible for longer-term subsidies (Energypress, 2018) before the entry into force of the new Regulation.

The government proposed a capacity mechanism which would enable Greek lignite plants to obtain capacity contracts until 2033 and requested the EC's (DG COMP) urgent approval prior to the July 2019 deadline. The process was initially very opaque as only the Greek government and DG COMP were aware of the proposals' contents. However, actions by environmental NGOs and Spanish MEP Marcellesi (European Parliament, 2019) exerted pressure which forced the government to open the proposal for public consultation on April 2019, just for 18 days.

The Green Tank and ClientEarth participated in the consultation, arguing that the proposed capacity mechanism had two major problems (The Green Tank, 2019a; ClientEarth, 2019). First, it did not prove its necessity since: a) necessary market reforms included in the target model were not implemented at that time; b) a Resource Adequacy Assessment (RAA) did not accompany the proposal, while the most recent RAA by the Greek Independent Power Transmission Operator (ADMIE) failed to adequately prove a security of supply problem for Greece that could not be remedied without a permanent market-wide capacity mechanism, such as the one proposed; c) alternative forms of a capacity mechanism, such as a strategic reserve, had not been considered and comparatively evaluated with the proposed one. Second, the proposed capacity mechanism attempted to unduly support lignite plants at the expense of other technologies and violated the recently agreed recast EMR, as well as the Guidelines on State aid for environmental protection and energy.

As the deadline of July 4, 2019, for exploiting the loophole of the recast EMR was approaching and the crucial approval of the Greek capacity mechanism by DG COMP was still missing, the Greek government made a desperation move: on the very last day the Greek Parliament operated before closing for the national elections, the Minister of Environment and Energy tabled an amendment to an irrelevant bill unilaterally approving the market-wide capacity mechanism it was still negotiating with the EC. The amendment was adopted by the Greek Parliament on June 7, 2019, thus before the July 4 deadline. However, without the Commission's approval this mechanism would constitute illegal State aid. This point was indirectly verified by the PPC's CEO, who, on June 19, 2019, sent a letter to the Commissioner for Competition Vestager pleading with her to approve the Greek capacity mechanism to partially salvage PPC's investment in Ptolemaida 5 (PPC, 2019a).

Despite these desperate efforts by the Greek government and the PPC, the European Commission did not approve the Greek capacity mechanism before the recast EMR came into force on July 4, 2019. Therefore, none of the existing Greek lignite plants would be eligible to participate in any capacity mechanism beyond July 2025, whereas the new lignite plant "Ptolemaida 5" would be unable to participate at all, thus further deteriorating its economic prospects.

**4.5 The lignite sale attempts**

While the Greek government and PPC were trying to extract an approval from the EC for the participation of lignite plants in a capacity mechanism, PPC moved forward with the actual sale of the lignite assets as agreed with the Institutions and enshrined into law.

In July 2018, PPC completed the evaluation of the companies that expressed interest in acquiring 100% of the share capital of the two disinvested companies that were created from PPC according to Law 4533/2018. Six companies were selected to submit binding offers (PPC, 2018). Following successive postponements of the deadline to make the lignite assets more attractive, the deadline approved by DG COMP was February 8, 2019. After a few days, PPC announced the failure of the highly anticipated sale (PPC, 2019b).

The single valid bid submitted by the Greek company Mytilineos S.A. concerned only one of the three lignite plants up for sale, while the reported €25 million offer was rejected because it was six times smaller than the corresponding appraisal of the independent evaluator. A second bid for all three lignite plants was also submitted by Czech company Sev.en Energy in collaboration with GEK TERNA. However, it was rejected upon reception since it contained a mechanism of sharing losses and profits between the new owners and PPC which did not comply with the terms of the SPA and because the offer of €103 million was almost three times lower than the evaluator's appraisal (Liaggou, 2019).

Amid concerns that after the first failure the Institutions would force PPC to part with its valuable hydroelectric plants, the PPC's CEO reiterated the commitment of the company to repeat the same tender and expressed his optimism that the second effort would be successful, provided DG COMP approved the capacity mechanism. The tender procedure was relaunched on March 8, 2019 (PPC, 2019c) and a week later interest was expressed by six companies, five of which, had expressed interest in the first tender (PPC, 2019d). Even though there was no floor price set by an independent evaluator in this second attempt, no company submitted a binding offer on the PPC lignite package or parts of it (PPC, 2019e).

**4.6 After the failure to sell**

The result of the general elections on July, 2019 meant another shift in government. The two failed attempts to sell PPC's lignite assets proved beyond any reasonable doubt that the energy market saw no future in exploiting Greek lignite, especially under conditions of escalating carbon prices. This realization together

with PPC's rapidly deteriorating economics, in large part due to its loss-making lignite industry (The Green Tank, 2019b) led the new government to the decision to phase out lignite by 2028. The historic announcement was made by the newly elected Prime Minister in the UN Climate Action Summit in New York on September 23, 2019 (Mitsotakis, 2019; EBC, 2019d).

In December 2019, the phase out decision was enshrined in PPC's new business plan (Koutantou, 2019) as well as in the NECP that Greece submitted to the EC (Ministry of Environment and Energy, 2019), in line with the EU's added climate ambition as presented in the EU Green Deal. Both documents included a detailed phase out timeline, according to which all existing lignite plants would retire by 2023 and only the new "Ptolemaida 5" lignite plant, which was still under construction at the time, would operate between 2023 and 2028.

These historic developments constituted the healthiest turn in Greece's recent energy and climate policy and essentially nullified the whole idea of breaking PPC's lignite monopoly by allowing access to lignite assets to other power companies, imposed through the sMoU. However, the EC refused to admit this was the case and insisted on PPC's compliance with the GCEU's judgment.

To address DG COMP's uncompromising attitude, the Greek government proposed several solutions. After several rounds of negotiations, a deal was struck in 2021 (European Commission, 2021) and was enshrined into national legislation (Greek Government, 2021). It involved bilateral Power Purchase Agreements formed between PPC and other power suppliers, through which PPC would offer rival suppliers electricity packages equal to percentages of its lignite-based electricity production the previous year at prices below day-ahead market (DAM) prices over a three-year period. Specifically, in 2021, PPC would sell electricity packages equalling 50% of the lignite-based electricity it produced in 2020, while in 2022 and 2023, the utility would offer for sale electricity equal to 40% of the lignite-based production in the respective previous years.

The first auctions took place on September 2021 and sold 978 GWh in total, surpassing the 893 GWh corresponding to PPC's 2021 obligation (Energypress, 2021a). Moreover, 1740 GWh were sold in October 2021 (Energypress, 2021b), but that quantity was smaller than PPC's 2022 obligation of 2136 GWh. The implementation of the antitrust agreement further deteriorated in 2022, as the electricity package PPC offered to sell in October 2022 to fulfil its obligation for the first three quarters of 2023 did not attract any interest from suppliers and traders due to the high risk involved and the financial pressure stemming from the energy crisis. With one last lignite package remaining to be offered by PPC, Greece submitted a request to the EC to have the antitrust agreement abolished (Energypress, 2022). Apparently the request was not accepted.

Finally, the case, which begun almost 15 years before, was settled with the sale of the last package of "lignite energy" by PPC on November 1st 2023 (PPC, 2023).

## 5. Conclusion and policy implications

The four Institutions involved in Greece's economic rescue programs and the European Commission in particular, insisted on the partial privatization of PPC's lignite assets based on a case that was initiated 15 years ago when the economic realities of lignite and EU climate and energy policy were vastly different. A variety of options were attempted to remedy the distortions of the Greek electricity market. However, all neglected a fundamental truth: Competition for the benefit of electricity consumers and the Greek economy cannot be stimulated through lignite, a fuel which has been rendered uneconomic and obsolete by the EU-led global effort to fight against the rapidly escalating climate crisis. Furthermore, it is evident that even within the European Commission there is a real problem of coordination between different Directorate Generals (DG COMP in particular) as climate policy has not been incorporated horizontally into other policies.

The double failure to attract the interest of the energy market in Greece and abroad for PPC's lignite assets proved beyond any reasonable doubt the flawed rationale of the EC's DG COMP when it was imposing the lignite sale on PPC and the Greek government, through the supplemental Memorandum of Understanding, in 2017.

However, blind, one-dimensional approaches based on general theories on the benefits of a fully liberalized market, such as those imposed by the four Institutions to Greece, could have hindered the country's sustainability prospects. Had the economics of Greek lignite plants not been as dismal as they are, fresh funds could have been injected in Greece's lignite industry. This could have, in turn, led to additional market distortions, which would have prolonged Greece's dependence on lignite at the detriment of the climate, nature, public health and the Greek economy.

The implications are of an even bigger scale. If the tactics and measures imposed by the Institutions were applied in countries that are not EU member states, in parts of the world lacking the EU's robust energy and climate institutional framework, the shift away from lignite would have been even harder. Hence, the example of the Greek lignite divestment should be carefully analyzed by the Institutions and the conclusions drawn should lead to significant changes in the way that economic rescue programs are designed and implemented in the future.

The role of the environmental NGOs and think tanks in these policy developments was critical. They provided fact-based analysis and well-documented arguments against the prolongation of the lignite-based electricity model in Greece, bringing also to light several of the attempts for derogations that would push Greece in the opposite direction.

Nevertheless, the efforts by environmental NGOs and think tanks from Greece and the EU alone would not have been enough to prevent a negative outcome for the sustainability of the country's entire energy future, had Greece not been a member state of the EU. It was the revision of EU-ETS Directive that was

responsible for the escalation of the carbon prices; it was the new Best Available Techniques conclusions in conjunction with the Industrial Emissions Directive which caused the need for expensive retrofits for Greece's lignite plants; it was the Electricity Market Regulation that ceased massive subsidies towards lignite plants. Finally, it is now the European Green Deal and the EU Climate Law, which render a return to lignite completely unrealistic.

The Greek lignite divestment case underlines, therefore, the contradiction and inconsistency between different departments of EU policy making. While the EC was pressuring Greece to sell PPC's lignite assets and prolong the polluting lignite-based electricity model, it was also developing the "Clean Energy for all European package" which aimed at shifting EU's energy model towards renewables.

For national decision makers, the recent history of lignite in Greece should prove that the hunt for derogations and loopholes in EU legislation to prolong the end of fossil fuels is not only fruitless but also not politically smart. It is costly in terms of funds, political capital, and time to implement real solutions to shield the country against energy crises such as the recent one. Had PPC and the Greek government not been so focused on extending the lifetime of lignite, PPC could have avoided spending more than €1.4 billion to construct the biggest "cross-party error" in Greece's energy policy as former Minister of Environment and Energy K. Hatzidakis characterized the construction of PPC's new lignite plant "Ptolemaida 5".

Furthermore, if instead of trying to implement a fundamentally wrong solution, the government and Greek political parties worked on designing a socially just transition of Greece's two lignite regions much earlier, more time would have been available for their undoubtedly challenging economic transformation.

Finally, Greece could have been able to scale up the deployment of renewables much earlier and the country would have had much lower electricity prices, smaller dependence on fossil gas and, therefore, would have been much better prepared to deal with the energy crisis.

The political choices made by Greek decision makers regarding Greece's lignite industry were short-sighted and failed to recognize the wave of change that was coming regarding lignite to the detriment of the Greek citizens. The same mistake should not be repeated. At a time when Greece is redesigning its energy future through the revision of its National Climate and Energy Plan, any attempts to stall the shift towards a fully renewables-based electricity model will be detrimental for the climate, the national economy, and the public interest.

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RESEARCH NOTE
ΕΡΕΥΝΗΤΙΚΟ ΣΗΜΕΙΩΜΑ

# The European Union's Engagement in the Arctic through its Environmental Policy in an era of unprecedented tensions

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## Abstract

In the aftermath of the war in Ukraine, the use of the Arctic seems to be associated with not only peaceful uses since it was always an era of tensions and conflicts among the superpowers. The EU seems to be willing to get more actively involved in the region through its environmental policy even though European Arctic States have their own individual interests and policies at the Arctic Ocean. European Union seems to be willing to discuss on the basis of the effective government of the region regarding the management of living and nonliving national resources and the navigation challenges arising from the melting of the ice in order to contribute to the establishment of the peaceful use of the Arctic Ocean.

**Keywords:** Arctic, European Union, Climate Change, Governance

# Η εμπλοκή της ΕΕ στην Αρκτική μέσα από την περιβαλλοντική της πολιτική σε μια εποχή πρωτοφανών εντάσεων

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## Περίληψη

Στον απόηχο του πολέμου στην Ουκρανία, η χρήση της Αρκτικής φαίνεται να συνδέεται όχι μόνο με ειρηνικές χρήσεις, καθώς αποτελούσε πάντα μια περιοχή εντάσεων και συγκρούσεων μεταξύ των υπερδυνάμεων. Η ΕΕ φαίνεται να είναι πρόθυμη να εμπλακεί πιο ενεργά στην περιοχή μέσω της περιβαλλοντικής της πολιτικής, παρόλο που τα ευρωπαϊκά κράτη της Αρκτικής έχουν τα δικά τους ατομικά συμφέροντα και πολιτικές στον Αρκτικό Ωκεανό. Η ΕΕ φαίνεται να είναι πρόθυμη να συζητήσει στη βάση της αποτελεσματικής διακυβέρνησης της περιοχής σχετικά με τη διαχείριση των ζώντων και μη ζώντων εθνικών πόρων και τις προκλήσεις ναυσιπλοΐας που προκύπτουν από το λιώσιμο των πάγων, προκειμένου να συμβάλλει στην εμπέδωση της ειρηνικής χρήσης του Αρκτικού Ωκεανού.

**Λέξεις κλειδιά:** Αρκτική, Ευρωπαϊκή Ένωση, κλιματική αλλαγή, διακυβέρνηση

## 1. Introduction

The Arctic region has increasingly emerged as a center of geopolitical interest and strategic maneuvering, particularly for the European Union (EU). The EU's involvement in the Arctic is driven by a combination of pragmatic economic considerations and a commitment to addressing urgent environmental issues. This dual approach was articulated in the European Commission's Arctic policy, released in 2021, titled "A Stronger EU Engagement for a Peaceful, Sustainable and Prosperous Arctic" (EUAP) (European Commission, 2021). The document emphasizes the EU's ambition to strengthen its presence and influence in the Arctic while highlighting the importance of collaboration, sustainability, and the immediate need to combat climate change.

As the Arctic's natural resources continue to attract global attention, their political and economic significance is expected to increase in the coming years. Given the EU's substantial market power and leadership role in climate policy, its aim to enhance its presence in the region is not unexpected. The EUAP portrays the Arctic as a zone for peaceful collaboration, stressing the urgent need to mitigate climate change impacts and promote sustainable development for the benefit of local communities.

The geopolitical landscape has shifted dramatically, particularly in light of escalating military tensions in Europe following Russia's invasion of Ukraine. This situation has compelled the EU to reassess its role in fostering European and international security. The 2022 Strategic Compass reflects the EU's commitment to becoming "a more capable security provider for its citizens and a stronger global partner for international peace and security" (European Council, 2022). This article explores the rising tensions in the Arctic and the EU's interests, examining the role that the EU hopes to play through its environmental policy.

## 2. The Rise of Tension: The EU's Interest in the Arctic

Global interest in the Arctic intensified dramatically in 2007 when Russia famously planted a flag on the North Pole, signaling its intent to claim sovereignty over the resources beneath the ice (Bennett, 2019). This act raised significant legal and geopolitical questions, particularly concerning the United Nations Convention on the Law of the Sea (UNCLOS). According to UNCLOS, coastal states have exclusive rights to exploit natural resources within 200 nautical miles of their baseline, while the North Pole itself falls within the global maritime commons, accessible to all nations (United Nations, 1982).

Securing maritime routes is of paramount importance, especially considering that approximately 80% of global trade occurs via the sea. In 2019, about 15% of vessels navigating Arctic waters were registered under flags of EU member states, underscoring the EU's vested interest in maintaining secure ocean routes for economic stability (European Commission, 2021). In response to evolving se-

curity threats, the EU's new Maritime Security Strategy emphasizes the necessity of securing Arctic sea routes by 2025 through enhanced satellite observation capabilities (European Commission, 2020).

The Arctic comprises eight states: the United States, Sweden, Finland, Denmark, Norway, Canada, Iceland, and Russia. Although the EU does not border the Arctic Ocean, it has maintained a keen interest in the region, particularly following the accession of Finland and Sweden in 1995. Through its relationships with Iceland and Norway—part of the European Economic Area (EEA)—the EU benefits from an open market policy with specific Arctic regions. Since 2007, the EU's interest in Arctic issues—including climate, environmental, and social concerns—has expanded, culminating in its bid for observer status in the Arctic Council, a request that remains unfulfilled (Arctic Council, 2021).

Historically, the narrative surrounding EU-Russia cooperation in the Arctic was one of "exceptionalism." Despite ongoing political tensions, Russia remained a key energy supplier to the EU until early 2022, with many hydrocarbons sourced from its Arctic territories (Moe, 2022). The EU had viewed Russia's untapped energy resources as crucial to its future energy security, a relationship it sought to maintain in accordance with its 2016 Arctic strategy. However, the onset of the Ukraine war dramatically shifted this dynamic, leading to extensive economic sanctions imposed by the EU on Russian exports (European Commission, 2022).

The Northern Sea Route, anticipated to serve as a significant trade shortcut between Asia, Europe, and North America, underscores the EU's economic interests in the Arctic. Climate change is expected to open new Arctic routes, and the EU aims to manage these developments responsibly in collaboration with Arctic states under UNCLOS.

The EUAP of 2021 outlines various challenges influencing its Arctic stance, including geographic proximity, increasing militarization, territorial disputes, and competition for resources. These factors, alongside global environmental threats posed by climate change, form the basis for the EU's argument advocating for greater involvement in Arctic affairs. Consequently, the European Arctic emerges as a critical case study for understanding the complexities of European and international security and foreign policy.

## 3. The EU as an Emerging Geopolitical Power

Under the leadership of Ursula von der Leyen, who became president of the European Commission in 2019, the EU has embraced the notion of a "geopolitical Commission." This framework differentiates between "low politics," which pertains to economic, social, and environmental issues, and "high politics," encompassing national and international security matters (Von der Leyen, 2019). The latter remains under the jurisdiction of individual member states, underscoring the sensitivity of foreign policy, which is closely tied to national sovereignty. Most EU member states are also NATO members, to whom they delegate their military capabilities.

In this context, initiatives such as the EU Rapid Deployment Capacity and the European Peace Facility signify the EU's efforts toward enhancing its security and defense posture. The EU is striving to develop its military capabilities, reducing reliance on NATO for security matters, thereby characterizing von der Leyen's Commission as a 'geopolitical Commission' (European Commission, 2020).

The latest EU Arctic Policy contrasts sharply with its 2016 predecessor, which primarily focused on raising awareness of environmental degradation in the Arctic and the EU's climate initiatives. The new EUAP adopts a more geopolitical lens, with politicians from Sweden and Finland advocating for increased EU engagement in the Arctic. Former Finnish Prime Minister Antti Rinne has emphasized the necessity of a robust EU presence in the region (Rinne, 2021).

The EU envisions the Arctic as a "safe, stable, sustainable, peaceful, and prosperous" area, articulating its future aspirations. When the EUAP was released in 2021, the geopolitical threat posed by Russia was less pronounced than it is today. Consequently, the policy frames the EU's Arctic engagement within the broader context of the European Green Deal. The EUAP sets forth plans for reforming internal policies to achieve carbon neutrality by 2050, emphasizing the cessation of fossil fuel extraction while promoting sustainable energy production in the Arctic (European Commission, 2021).

However, the ongoing energy crisis, largely driven by deteriorating relations with Russia, raises questions about the feasibility of these plans. The core premise of the EUAP revolves not around traditional military security but rather the environmental security threats posed by climate change. These elements are interconnected; rising Arctic temperatures increase access to new resources and transportation routes, transforming the region into a "theater of local and geopolitical competition" that could undermine EU interests. The EU's approach aligns with comprehensive security theory, emphasizing the interplay of various security dimensions, with environmental security positioned as the most urgent concern, followed by economic, military, societal, and political security (Bailes et al., 2022). While the EU has vested interests in the Arctic, it also views its role as a geopolitical power as essential for ensuring global environmental security.

## 4. Changing Geopolitical Context and EU-Russia Arctic Relations

The Arctic's geopolitical landscape is shifting from a paradigm of 'exceptionalism' to one characterized by competition among major powers, including Russia, the United States, the EU, and China. This transformation has roots in ongoing crises in Europe since 2007, continuously reshaping the EU-Russia trade relationship (Götz & Storch, 2022).

The illegal annexation of Crimea by Russia marked a pivotal moment, significantly impacting the dynamics of cooperation. The EU's reliance on Russian en-

### 5.2. International Treaties and Agreements

The EU actively engages in international climate agreements, reinforcing its commitment to combat climate change. The Paris Agreement, with its aim to limit global warming to well below 2 degrees Celsius, serves as a critical framework for the EU's climate initiatives (UNFCCC, 2015). The EU has established legally binding targets to achieve carbon neutrality by 2050, signaling its dedication to sustainable practices and climate resilience.

The EU's advocacy for international cooperation in the Arctic is evident in its support for various treaties and agreements, including the UN Convention on Biological Diversity (UN CBD) (United Nations, 1992). By emphasizing the need to conserve Arctic ecosystems and address threats such as overfishing and habitat destruction, the EU seeks to promote sustainable development and protect biodiversity in the region.

### 5.3. Promoting Research and Innovation

Scientific research and innovation are crucial components of the EU's Arctic strategy. Collaborative research initiatives aim to enhance understanding of climate change impacts and develop adaptive strategies for vulnerable communities. Programs like Horizon Europe support research projects focusing on sustainable Arctic development, climate resilience, and the integration of Indigenous knowledge (European Commission, 2021).

By fostering collaboration among academic institutions, governments, and Indigenous communities, the EU seeks to create a comprehensive understanding of the interconnected challenges facing the Arctic. This approach aligns with the EUAP's emphasis on participatory governance, recognizing the importance of diverse perspectives in shaping effective climate policies.

### 5.4. Building Partnerships with Indigenous Peoples

Indigenous peoples are key stakeholders in Arctic governance and climate adaptation strategies. The EU acknowledges the importance of engaging Indigenous communities in decision-making processes, recognizing their traditional knowledge as invaluable in addressing climate change. Collaborative initiatives aim to empower Indigenous voices and promote their participation in governance structures.

By incorporating Indigenous perspectives into climate policies, the EU enhances the legitimacy and effectiveness of its initiatives. This collaborative approach fosters mutual respect and understanding, contributing to more sustainable outcomes for Arctic communities. The EU's commitment to recognizing the rights and contributions of Indigenous peoples is integral to its climate diplomacy.

## 6. Implications of the EU Green Deal for the Arctic

### 6.1. Economic Transition to Sustainability

The Green Deal advocates for a transition to a sustainable economy, which has direct implications for the Arctic. The EU aims to promote green technologies and practices that can create jobs while safeguarding the environment. This includes supporting renewable energy projects in the Arctic, reducing reliance on fossil fuels, and enhancing energy efficiency (European Commission, 2020).

### 6.2. Enhanced Resilience of Arctic Communities

The EU's commitment to climate adaptation within the Green Deal has significant implications for Arctic communities, particularly Indigenous populations. By prioritizing local engagement and knowledge, the EU can enhance the resilience of these communities against climate impacts, ensuring their voices are heard in decision-making processes (European Commission, 2021). This participatory approach aligns with the EU's goal of promoting social equity and inclusivity.

### 6.3. Strengthened Regulatory Frameworks

The Green Deal reinforces the need for robust regulatory frameworks that govern environmental protection in the Arctic. This includes stricter regulations on pollution, resource extraction, and habitat conservation. By promoting high environmental standards, the EU can help prevent ecological degradation in the Arctic and ensure sustainable development practices are followed (European Commission, 2019).

## 7. The Future of the EU in the Arctic

### 7.1. Balancing Economic Interests and Environmental Sustainability

As the EU navigates its engagement in the Arctic, balancing economic interests with environmental sustainability remains a critical challenge. The prospect of accessing valuable resources and trade routes must be tempered by a commitment to responsible stewardship of the Arctic ecosystem. The EU must leverage its market power to advocate for sustainable practices and engage in responsible resource management.

The transition to renewable energy sources presents both challenges and opportunities for the EU in the Arctic. As the region faces pressure from resource extraction and climate change, the EU's approach to economic development should prioritize sustainability and resilience.

### 7.2. Strengthening Multilateral Cooperation

The EU's approach to Arctic governance should prioritize multilateral cooperation, engaging with Arctic states, Indigenous communities, and international organizations. Strengthening partnerships will enhance the effectiveness of climate initi-

atives and foster dialogue on pressing geopolitical issues. By promoting collaborative governance, the EU can contribute to a more stable and sustainable Arctic.

The EU's role as a facilitator of dialogue among Arctic stakeholders is crucial in addressing complex issues such as resource management, climate change adaptation, and Indigenous rights. Collaborative initiatives that involve various actors can lead to more effective solutions and foster a sense of shared responsibility.

### 7.3. Enhancing Security and Resilience

In light of rising geopolitical tensions, the EU must enhance its security posture in the Arctic while remaining committed to environmental security. This entails investing in research and technology to address security challenges and develop resilient strategies for responding to climate change impacts. The EU's Maritime Security Strategy must be adapted to address the unique dynamics of the Arctic, emphasizing the importance of safeguarding shipping routes and ensuring safe navigation.

Enhancing resilience in the face of climate change requires a multi-faceted approach, including investing in infrastructure, fostering community engagement, and promoting sustainable practices. The EU can play a pivotal role in facilitating these efforts through targeted funding and support.

### 7.4. Advocating for Inclusive Governance

The EU should continue to advocate for inclusive governance structures that prioritize the voices of Indigenous peoples and local communities. Ensuring their participation in decision-making processes will enhance the legitimacy of Arctic policies and foster greater public support for sustainability initiatives.

Inclusive governance not only strengthens democracy but also leads to more effective policy outcomes. By actively engaging with diverse stakeholders, the EU can foster a sense of ownership and shared responsibility for the future of the Arctic.

### 7.5. Preparing for Future Challenges

The Arctic is poised to face numerous challenges in the coming decades, including increased shipping traffic, resource extraction, and the impacts of climate change. The EU must remain proactive in addressing these challenges, adapting its strategies to reflect evolving geopolitical dynamics and environmental realities. By fostering resilience and promoting sustainable development, the EU can contribute to a more secure and prosperous Arctic.

Preparing for future challenges involves a commitment to long-term planning and adaptive management. The EU's ability to respond effectively to emerging threats will depend on its capacity to anticipate change and foster collaboration among Arctic stakeholders.

## 8. Conclusion

The evolving geopolitical dynamics in the Arctic necessitate a re-evaluation of the EU's role in the region. With climate change accelerating and new economic opportunities emerging, the EU's engagement in the Arctic must prioritize environmental security while addressing the realities of geopolitical competition. The EUAP provides a comprehensive framework for navigating these complexities, advocating for sustainable development, effective governance, and cooperation among Arctic stakeholders.

This article illustrates how the ideas of policy coherence and integration can help assess responses to the cross-border effects of climate change, a relatively underexplored area. Using the example of EU Arctic policy, we demonstrated that evaluating cross-border policy coherence can uncover both synergies and conflicts between climate adaptation efforts and other policy goals. This understanding can inform the development of more effective strategies to prevent, mitigate, or capitalize on the cross-border impacts of climate change. Our findings from the EU-Arctic case emphasized several key considerations for evaluating policy coherence and integration:

Addressing the coherence of policies related to cross-border climate change adaptation is complex, involving various actors across different jurisdictions and multiple policy areas (e.g., environment, trade, security, tourism, agriculture, fisheries, forestry, and cultural heritage) (Biesbroek & Candel, 2020; Biesbroek, 2021). The Arctic example showcased this complexity, revealing conflicts between pursuing new economic opportunities and protecting vulnerable ecosystems and communities.

A thorough analysis of coherence must consider the different mandates of involved actors, which can lead to overlaps or gaps in policy responses. Our case highlighted the distinct interests of Arctic indigenous communities and Arctic states, as well as the limited influence that indigenous communities and the Arctic Council have as policy stakeholders. Interviews indicated that indigenous representatives feel their concerns are often overlooked in policy-making. Evaluations of policy coherence should account for power imbalances that may lead to inconsistencies or conflicts in policy (Harrinkari et al., 2016; Kröger & Raitio, 2017).

While policies may seem coherent at the objective level, implementation can reveal conflicts, as illustrated in our case. Issues such as prioritizing certain policy objectives (like trade over adaptation), the ability of various actors to influence implementation, and unexpected outcomes during the policy process can all contribute to this. Additionally, the push for coherence can lead actors to present their objectives as more aligned than they truly are.

These insights highlight the necessity for detailed evaluations of cross-border policy coherence, requiring comprehensive information about policy processes, implementation, and outcomes. For example, our case emphasized the impor-

tance of understanding the rights and conditions affecting indigenous groups as they navigate natural resource exploitation across borders, especially as they adapt their traditional livelihoods to climate change (Magga, 2024).

Evaluations are merely the starting point for enhancing cross-border policy coherence. Prior research has pointed out the difficulties in achieving coherence across administrative domains (Carbone, 2008; Furness & Gänzle, 2017). The cross-border context intensifies these challenges, as responses to impacts require input from actors operating in diverse political and jurisdictional environments. Our example identified several specific challenges: (1) Seeking consensus within the complex governance of the Arctic may hinder integration and coherence, as the demands of various actors often conflict. (2) Cross-border climate change responses can negatively affect sub-national actors, such as indigenous communities, even if the overall impact is positive. (3) Adaptation policies may overlook coherence issues by failing to consider the opportunities for resource exploitation that climate change presents. Furthermore, geopolitical events, such as the Russian attack on Ukraine, can drastically alter the frameworks of policy integration and coherence, necessitating a dynamic understanding of these concepts (Biesbroek & Candel, 2020; Biesbroek, 2021).

We recommend that policymakers integrate climate adaptation objectives into other policy domains that inherently address cross-border issues, including foreign affairs, security, trade, and finance. The EU, facing many cross-border climate impacts, should proactively expand its adaptation policies to include these dimensions. A crucial first step is to establish formal objectives and measures that enhance coherence across various policy areas. Achieving coherence between climate policies and other domains, and among different regions interconnected through global trade and relations, should be a primary objective for entities like DG Trade, DG Clima, and EEAS within the EU. This goal should extend to policy instruments, including adjustments in trade agreements and collaborations with regions most affected by climate change (Benzie et al., 2019; Lung et al., 2017).

The cross-border context underscores the link between policy integration and coherence. Incorporating climate adaptation objectives into areas like trade, finance, and security can be a fruitful approach to tackling cross-border climate impacts. While policy integration lays the groundwork for addressing these impacts, it must be accompanied by active efforts to involve a broader range of actors to foster comprehensive policy coherence at horizontal, vertical, and cross-border levels.

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BOOK REVIEW
ΒΙΒΛΙΟΚΡΙΤΙΚΗ

# EU Climate Diplomacy towards the IMO and ICAO

## George Dikaios, Palgrave Macmillan, 2024

This book unfolds a new reading in the ever-growing European Union climate policy and diplomacy literature. Namely, the book engages in a direct dialogue with the post-2010 body of literature on EU climate diplomacy, drawing extensively from a substantial corpus of scholarly articles that critically analyse the transformation and progression of the EU's climate diplomacy across distinct phases. By thoroughly engaging with this existing literature, the author situates the book within the expansive academic discourse, thereby contributing novel insights into the EU's external climate action.

Unlike existing approaches that focus on the EU's climate diplomacy either within the context of the United Nations Framework Convention on Climate Change and beyond (Minas & Ntousas, 2018) or towards other states through European embassy narratives (Buchmann, 2022), this book offers an in-depth examination of the EU's external action and diplomatic practices, particularly within the framework of Normative Power Europe (NPE) theory. In other terms, the author takes a nuanced approach to illustrate how the EU exports its position at the international level by applying the NPE theory as a tool of external action (Chapter 2). To that end, Dikaios introduces a three-level approach: internal processes ("what the EU intended to negotiate"), external processes ("the means deployed to negotiate the agreed position"), and outcome evaluation ("the EU's ability to influence in favour of this position"), structuring in that way the interrelation between the internal policymaking and the EU's external action and effectiveness (Chapter 3). The ultimate question it aims to answer through this examination is "In what ways does the EU perform normative power in the field of climate diplomacy?", followed by an assessment of whether the EU is or is not a normative power. At the same time, by addressing the question of whether the EU performs normative power in the field of climate diplomacy, the author identifies and seeks to bridge a gap in the existing literature between NPE and EU (climate) diplomacy, connecting them with the notion of "structural diplomacy". The empirical part of the book examines the EU's climate diplomacy performance towards the cases of the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO).

In particular, the author elaborately links the analytical framework outlined in the previous chapters with the empirical data analysis in Chapters 4 and 5. This analysis utilises a rich dataset of fifty-four semi-structured interviews with EU officials, providing insights into the EU's tactics for influencing the two IOs in climate change. Not only does this thorough analysis clarify the EU's strategies, but it also addresses gaps identified in the secondary literature review and document analysis concerning the externalisation of the EU's climate norm, which concludes

that it centres on mitigating GHG emissions. More specifically, Chapter 4 offers a detailed examination of the internal processes within the EU, focusing on 'competence', 'coordination', and 'coherence'; it underscores the constant battle for competence between the EU supranational instutions and its member states, particularly in mitigating GHG emissions in transportation (competence); it delves into how the Commission persuades member states to align their positions and presents a compelling argument for the EU's coordination competence (coordination); it highlights the significance of coherence in projecting a unified EU voice in international arenas (coherence). Through the abovementioned analysis, the author effectively demonstrates how these mechanisms work in tandem to enhance the EU's influence at the supranational level by providing a significant understanding of the EU's internal dynamics and its interaction with member states.

Chapter 5 analyses the external processes at the international level, scrutinizing the NPE theory through the six mechanisms outlined by Manners (2002): contagion, informational diffusion, procedural diffusion, transference, overt diffusion, and cultural filter. These mechanisms are pivotal in determining the EU's influence within the two IOs. This chapter also examines the impact of Covid-19 on selected mechanisms, particularly overt and procedural diffusion within the two IOs. The author in this chapter also evaluates the effectiveness of the EU's performance through the outcomes within the IMO and the ICAO, employing the lenses of "diplomatic cohesion" and "NPE mechanisms". It is noteworthy that the negotiation results may not entirely align with the EU's interests when scrutinizing "diplomatic cohesion". Similarly, the assessment of NPE mechanisms reveals that even when impeccably applied in the relation of the EU with third parties, effectiveness is not assured.

The final chapter of this book (Chapter 6) circles back into answering the research question of whether the EU possesses the normative power to influence the operational norms of international organisations such as the IMO and the ICAO regarding GHG mitigation. The author astutely argues that despite the EU's unwavering efforts to drive the climate agenda forward and establish impactful regulations, the prevailing sentiment within the international community, namely into the two IOs, opposes significant challenges. Consequently, the EU's endeavours to wield normative power and reshape the norms of the IMO and the ICAO have fallen short, at least to great extent. Yet, the book's narrative does not culminate there. The author adeptly illustrates that the NPE mechanisms, as elucidated in Chapter 3, can be effectively applied at the internal level of the EU, thereby conferring upon it the status of a normative power within its internal domain. This thought-provoking exploration ultimately leads to an interdisciplinary and uncharted conclusion: while the EU can be perceived as a normative actor in the international arena concerning the two IOs, it undeniably assumes the role of a normative power in its internal sphere. This uncommon perspective offers readers a compelling and insightful re-evaluation of the EU's normative influence, shedding light on its multifaceted presence on the global stage.

In conclusion, the book offers a thorough analysis of the EU's efforts to impact the IMO and the ICAO in the context of GHG mitigation through normative power. Despite encountering challenges in reshaping international norms, the EU demonstrates normative power within its internal sphere. Additionally, the book significantly contributes to understanding European diplomacy in the context of climate change, highlighting how climate policy serves as a crucial tool for the EU's external action. This nuanced perspective on the EU's influence makes it an engaging and insightful read for those interested in international relations and climate governance; the book can be additionally useful for policymakers and diplomats, particularly those from the EU Member States and EU institutions, as well as third countries and parties.

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