Climate Change Economics—Bridging the Gap Between Scientific Urgency and Policy Inaction

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ABSTRACT

Despite the overwhelming scientific consensus on climate change, policy responses remain fragmented and insufficient in relation to the magnitude of the challenge. This study presents a structured review and a policy-oriented synthesis of the economic and political factors underlying the persistent gap between scientific urgency and political action. Drawing on the environmental economics and political economy literature, it examines key concepts such as negative externalities, the Social Cost of Carbon, and central policy instruments, including carbon pricing, public investment, and regulatory approaches. Instead of offering new empirical estimates, the article develops an integrated conceptual framework for climate policy design that explicitly links economic efficiency, social equity, and political feasibility. It uses it to systematically evaluate the trade-offs and complementarities among alternative policy instruments. It argues that no single policy instrument can simultaneously optimize these objectives and that effective climate governance requires coordinated policy packages that combine carbon pricing, redistribution mechanisms, and strategic industrial policy. By synthesizing theoretical contributions and empirical findings from the existing literature, the article proposes a structured approach to complementarities of climate policies, highlighting the institutional and political constraints that shape implementation. The analysis emphasized that bridging the gap between scientific knowledge and political action is fundamentally an issue in policy design and political economy, rather than a lack of empirical evidence or analytical tools.

Keywords: Social cost of carbon, Integrated assessment models, Carbon pricing mechanisms, Border carbon adjustments, Climate policy political economy

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Introduction

Climate change represents a global systemic risk with broad economic, social, and geostrategic implications. Scientific evidence synthesized by the Intergovernmental Panel on Climate Change shows that greenhouse gas (GHG) emissions from human activity are the main driver of the observed increase in global temperatures.[1] The consequences of global warming, including sea-level rise, biodiversity loss, and increased frequency of extreme weather events, pose significant risks to food security, public health, infrastructure, and long-term economic development. Despite this strong scientific consensus, global policy responses remain fragmented and insufficient relative to established climate goals. Current Nationally Determined Contributions (NDCs) under the Paris Agreement are not aligned to limit global warming to 1.5–2 °C.[2] This persistent gap between scientific urgency and political action reflects a combination of structural barriers, including market failures, institutional constraints, and political economy dynamics that hinder effective climate change mitigation.

This article provides a structured review and a policy-oriented synthesis of the economic and political factors underlying this gap. Its aim is not to provide new empirical results, but rather to integrate existing theoretical and empirical knowledge into a coherent conceptual framework for the development of climate policies. The article examines essential economic mechanisms—particularly negative externalities and the Social Cost of Carbon (SCC) and reviews key policy instruments, including carbon pricing and public investment strategies.[3,4] Furthermore, it analyzes the political and institutional constraints that hinder policy implementation and contribute to persistent inaction.[5–8]

The main contribution of this article is to develop an integrated framework for climate policy design that explicitly links economic efficiency, social equity, and political viability, providing a structured analytical framework for evaluating and comparing policy trade-offs and complementarities across instruments and policy contexts.[9–12] By explicitly linking these dimensions to the design and interaction of policy instruments, such as carbon pricing, redistribution mechanisms, and industrial policy,[9,10,13,14] the framework highlights the inherent trade-offs and complementarities that shape an effective and politically viable climate policy.

The Economic Framework: Externalities and the Social Cost of Carbon

From an economic perspective, climate change is commonly understood as a negative externality, in which the environmental and social costs associated with GHG emissions are not reflected in market prices.[1,2] This results in a classic case of market failure, leading to excessive emissions and underinvestment in low-carbon technologies.[1,2] To address this issue, economists have developed the concept of the SCC, which estimates the economic damage associated with the emission of an additional ton of carbon dioxide.[3] The SCC is widely used in cost-benefit analyses of climate policies, providing a monetary parameter to evaluate mitigation efforts.[4] However, its estimation involves considerable methodological uncertainty, including assumptions about discount rates, damage functions, and future socioeconomic trajectories. As illustrated in Figure 1, market equilibrium, defined by the intersection of marginal private benefits and marginal

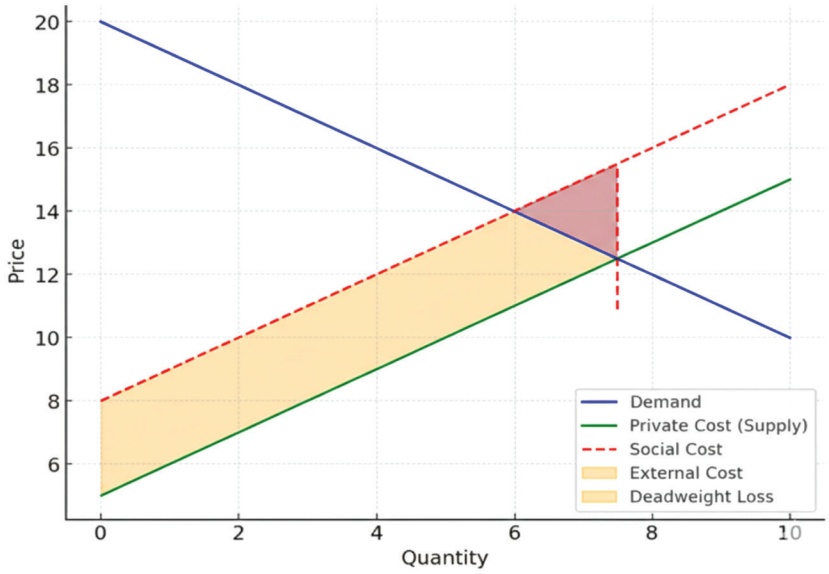

Fig 1 | Demand curve, private and social cost curves, cost gap, and the deadweight loss from the market failure

Note: Conceptual illustration based on the literature; not based on original data.
Source: Author's own conceptual illustration, based on Pigou[3] and Goulder[4]

private costs, results in an output level that exceeds the socially optimal outcome. When environmental damages are incorporated, the social cost curve rises above the private cost curve, reflecting the total cost of emissions to society. The resulting divergence leads to overproduction and a loss of social welfare. Internalizing this externality, for example, through carbon pricing, would shift production to the socially optimal level. In this context, the SCC provides a monetary estimate of the necessary correction, translating environmental damages into economic terms and guiding the development of more efficient climate policies. More broadly, this framework highlights the central role of price-based instruments in addressing the efficiency dimension of climate policy, while also pointing to the need for complementary measures to address distributional and political constraints.

The Social Cost of Carbon (SCC)

The SCC is derived from Integrated Assessment Models (IAM) such as DICE, FUND, and PAGE.[3,4] These models assess the link between the growth of GDP, the aggregation of GHGs, and the resultant damages to the environment for the sake of formulating policies.[15] Through the monetarization of the future impacts of climate change, IAM helps in the formulation of policies for the mitigation of such impacts.[16] IAMs usually couple climate theory with economic models in the following key components:[17]

- **Emission Scenarios**: Forecasted future emissions based on behavior assumptions.
- **Climate Response**: Where the effects of the concentration of GHG es occur.
- **Impact Assessment**: Assessment of the effect of climate change on physical and economic systems.
- **Cost Analysis**: Computing trade-offs of expenditure in mitigation and damages from climate change.[18,19]

The choice of discount rate—which, among other things, determines the value of future costs relative to the present—is crucial in SCC computations. A higher discount rate yields a lower SCC: it weights current benefits more heavily than future impacts.[3,19,20] Conversely, a low discount rate boosts the SCC by giving greater weight to the well-being of future generations and promoting more far-reaching policies.[4,21] A further integrative element concerns technological change; policy needs to price carbon but also generate incentives for the diffusion of renewable energies.[21,22] While groups such as the U.S. IWG provide SCC values computed from various IAMs, the variability remains high due to differing methodologies regarding risk and catastrophic outcomes.[23,24] One of the most controversial aspects of SCC estimation is the selection of the discount rate. It acts as a fulcrum point for determining how future costs and benefits are weighted in relation to present ones-a kind of bridge that links current investment to future welfare.[23] The rate chosen is by no means simply a technical exercise but a deep, ethical intergenerational equity choice:

- **High Discount Rate**: A higher discount rate results in a lower SCC. In that respect, this methodology places greater weight on present economic gains than on the future consequences of a particular action. This automatically lessens the burden of future damages caused by climate change. Therefore, this way of thinking has always resulted in less drastic policy measures regarding climate change because distant damages are less important when presented in present-value terms.[23,25]
- **Low Discount Rate**: Conversely, a low discount rate greatly raises the SCC by emphasizing the welfare of future generations. Giving greater weight to potential damages in the distant future, this view promotes more ambitious and severe climate policies, in which protecting future generations is worth more than the cost today.[4,24] The implications of SCC estimates are profound, as they serve as the analytical basis for designing effective climate treaties and statecraft.[25] These values guide regulatory measures, inform the evolution of institutions for collective action, and provide a metric for the "price" of governing the global commons.[26]

However, reaching a consensus in policy formulation remains a challenge. Even when using average values of the SCC — such as those provided by the Interagency Working Group (IWG) — substantial variability persists among estimates. This reflects differences in model structure, assumptions regarding climate damage, and approaches to uncertainty and risk.[27]

Table 1 presents an illustrative comparison of SCC estimates across models and discount rates. The values presented should be interpreted as indicative

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Table 1 | Illustrative comparison of SCC estimates across models and discount rates

Model/Source	Discount Rate	Illustrative SCC Range ($/tCO$_2$)	Key Assumptions
DICE (Nordhaus)	~3%	Illustrative lower-range estimates reported in the literature	Higher discounting, gradual damages
FUND	~3%	Lower-range estimates with sectoral variation	Sectoral and region-specific impacts
PAGE	~3%	Higher estimates under alternative damage assumptions	Greater weight on catastrophic risks
U.S. IWG (2015)	2.5–5%	Wide range depending on discount rates and model assumptions	Multi-model average, varying discount rates
EPA (2022 draft)	~2–3%	Higher estimates reflecting updated damage functions and risk assumptions	Updated damage functions and risk assumptions

Note: Values are illustrative and synthesized from the literature; they do not represent original estimates.
Source: Author's synthesis based on Nordhaus,[15,18,28] Stern,[16] U.S. Interagency Working Group,[23] and EPA.[29]

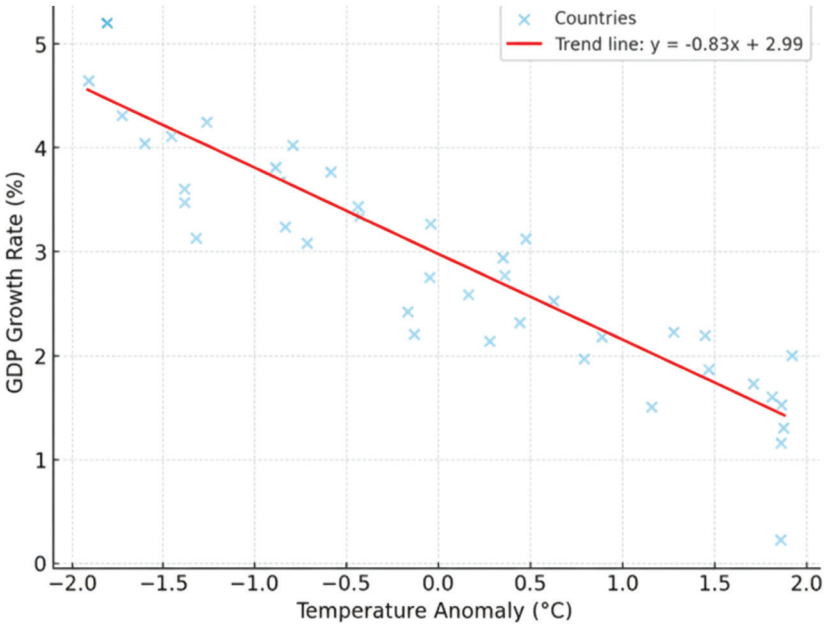

Fig 2 | Conceptual representation of the relationship between temperature anomalies and GDP growth

Note: Conceptual illustration based on the literature; not based on original data
Source: Illustrative figure inspired by Burke et al.[24]

ranges synthesized from the literature, and not as precise or directly comparable point estimates.

Table 1 illustrates the sensitivity of SCC estimates to discount rates and modeling assumptions, reinforcing the normative dimension of policy design. Even when similar discount rates are applied, estimates can vary significantly between models due to differences in damage functions, risk treatment, and assumptions about future socioeconomic trajectories.

Ultimately, the choice of discount rate is not merely a technical parameter, but a normative decision that incorporates ethical judgments about the relative value of present versus future well-being. The divergence between approaches with high and low discount rates, exemplified by Nordhaus and Stern, highlights a fundamental tension in climate economics between efficiency and equity. Consequently, estimates of SCC should be interpreted not as objective values, but as constructs relevant to public policy, shaped by underlying social priorities.

Evidence from Empirical Literature

Beyond theoretical frameworks, a growing body of empirical literature employs statistical methods to quantify the economic effects of climate change using historical data. These studies are used in the literature to identify and estimate the relationship between temperature variations and key economic indicators, including GDP growth, agricultural productivity, and labor market performance. Typically based on large international or panel datasets, this literature applies econometric techniques to isolate the impact of climatic variables on economic outcomes. The empirical literature consistently indicates that deviations from historical temperature norms have a statistically significant negative effect on economic growth,[24,25] a finding corroborated by a broader body of research on the economic impacts of climate variability.[30] Importantly, the relationship between temperature and economic output is not linear, with damages increasing disproportionately when temperatures exceed optimal thresholds. Recent empirical studies also show that climate change has contributed to increased global economic inequality, as warmer regions, more exposed to it, suffer greater income losses than colder regions.[31] The impacts of climate variability are unevenly distributed, disproportionately affecting low-income countries and climate-sensitive sectors such as agriculture and industry.[10,32] These effects often persist over time, leading to long-term reductions in economic performance. For example, studies in the literature suggest that a 1 °C increase in average annual temperature above historical baselines can have a measurable negative effect on GDP per capita.[32] While these estimates vary depending on methodology and data, they consistently point to significant economic damage associated with rising temperatures. These findings should be interpreted as stylized summaries of the empirical literature, and not as results derived from a new model presented in this article.

As illustrated in Figure 2, the relationship between temperature anomalies and economic performance reflects this non-linear dynamic. Taken together, the empirical literature reinforces the theoretical predictions of climate damage functions and highlights the potential for substantial underestimation of costs in models that assume gradual or linear impacts.[24,25,30] This evidence reinforces the need for preventive and proactive policy interventions, especially in regions most vulnerable to climate impacts.

Within the framework proposed in this article, these insights primarily inform the efficiency dimension of climate policy and highlight the importance of

integrating distributional and political considerations into policymaking.

Policy Instruments for Mitigation

There are several approaches available for policymakers to internalize the external costs of carbon, as widely discussed in the environmental economics literature.[7] The effectiveness of these instruments depends not only on their individual design, but also on how they are combined within a broader policy framework. Careful policy design is therefore essential to ensure both economic efficiency and political viability.

Carbon Pricing Mechanisms

Carbon pricing, in essence, aims to impose a cost on emissions to reflect their environmental and social impacts, thereby correcting the market failure, since these costs are otherwise not considered. Two major market instruments include carbon taxes and cap-and-trade systems. Carbon taxes are charges levied on every ton of carbon content of fossil fuels. This system has the advantage of creating a straightforward pricing system for carbon emissions, as it sends a strong signal to firms and households to shift to cleaner resources in the long run. Empirical evidence in the literature suggests that carbon pricing mechanisms are effective. Comparative analyses between countries show that jurisdictions that implement carbon pricing policies experience statistically significant reductions in emissions compared to jurisdictions that do not adopt this practice.[33,34]

Many carbon experts often advocate it as an easily manageable system in terms of transparency and administrative ease for the government.[35] Furthermore, these taxes have the benefit of creating enough funds that can be "recycled," for instance, in terms of investing in converting environmental infrastructure.[36,37] However, there are several political and economic pitfalls associated with carbon taxes. One of the key issues with carbon taxes is carbon leakage. When a country imposes a carbon tax on its domestic industries, making them comparatively less competitive than their global counterparts in other regions where the carbon prices are not set similarly.[38,39] As an alternative, cap-and-trade policies or carbon trading mechanisms set a strict target, or "cap," on total emissions within a particular sector of the economy.

The government then sets a finite number of carbon emissions allowances. These allowances are tradeable in a market.[40] As opposed to a carbon tax rate, the carbon price is subject to the market forces of demand and supply. With a carbon tax, industries get certainty of the carbon price. With cap-and-trade policies, the environmental target is guaranteed. No matter what the carbon price is, the overall emissions target is fulfilled.[18,41] The most successful examples of cap-and-trade policies are the European Union Emissions Trading Scheme (EU ETS) and other regional markets in North America.[42,43] While effective, the inherent price volatility in these markets can occasionally complicate long-term capital planning for participating firms. A detailed comparison is presented in Table 2.

Despite its solid theoretical basis, the practical effectiveness of carbon pricing is often limited by political and economic factors. Issues such as carbon leakage, distributional impacts, and public resistance can significantly weaken policy implementation.[38,39] Furthermore, while carbon taxes provide price predictability and emissions trading systems ensure emissions predictability, neither instrument alone is sufficient to address the scale and urgency of the climate challenge.[18,41] This underscores the need for complementary policies that enhance both effectiveness and political feasibility.

Subsidies and Direct Public Investment

While carbon pricing increases the cost of carbon-intensive energy, subsidies for green technology reward low-carbon alternatives, acting like a "carrot" approach. By reducing the relative cost of clean technology through feed-in tariffs for renewable electricity and tax credits for electric vehicle production, for instance, these mechanisms enable clean technology to compete more effectively with fossil fuels.[28] Government intervention is paramount in addressing market failures in research and development. Private firms are usually quite risk-averse, frequently avoiding the high upfront costs and the uncertainty associated with cutting-edge clean technologies. Correspondingly, public funding

Table 2 | National carbon tax vs. regional cap-and-trade systems

Metric	Canadian Carbon Tax	EU ETS
Policy Type	Carbon Tax	Cap-and-Trade (Emissions Trading)
Scope	Applies to most provinces and territories. Covers a broad range of fuels and emissions from industrial facilities, with a separate fuel charge and an output-based pricing system for large emitters.	The largest carbon market in the world, covering approximately 40% of the EU's GHG emissions. It includes power stations, industrial plants, and intra-European aviation.
Price/Allowance Mechanism	A direct tax rate on the carbon content of fuels, with the price set to increase annually. This provides price certainty for businesses and consumers.	A cap on total emissions is set and decreases over time. Companies receive or buy allowances, and their prices are determined by market supply and demand, leading to price volatility.
Emissions Reduction Performance	Estimated to be a key driver in Canada meeting its 2030 climate targets. However, the effectiveness is still subject to ongoing debate and depends on the specific price level and how revenues are recycled.	The EU ETS has successfully reduced emissions from covered sectors by over 40% since its introduction in 2005, making it a powerful tool for decarbonization.

Note: Information synthesized from secondary literature; values are indicative and not based on original analysis.
Source: Author's own elaboration based on Stavins,[9] Metcalf,[10] Ellerman et al.,[37] and Schmalensee.[38]

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catalyzes innovation by producing "public goods" in the form of spillovers that benefit the wider economy.[11,44] Emphasizing subsidies as investments in job creation and industrial growth remains generally more politically palatable than the "stick" of taxation and thus often enjoys broader public support.

Within the framework proposed in this article, these policy instruments play distinct yet complementary roles. Carbon pricing primarily addresses the efficiency dimension by internalizing external costs, while subsidies and public investment contribute to the equity and policy viability dimensions by supporting technological transitions and reducing resistance to policy implementation. This highlights that no single instrument is sufficient, reinforcing the need for integrated policy packages that balance these three dimensions.

Barriers to Action: The Political Economy of Climate Change

Despite a robust economic rationale and a diverse toolkit of policy instruments, implementing effective climate policy faces significant systemic hurdles.[45]

The Time Horizon Mismatch

A basic problem in climate policy is a temporal disconnect between costs and benefits. Carbon taxes and the like impose an immediate and concentrated cost on consumers through higher energy and fuel prices. Their benefits, by contrast, are diffused over decades and come primarily in the form of future ecological stability and avoided climate damages.[5] This creates a type of "political discount rate" whereby elected officials focused on short-term election cycles are incentivized to delay or dilute aggressive climate action to avoid immediate voter backlash. This behavioral bias, often modeled as hyperbolic discounting, leads society to overvalue immediate rewards while undervaluing large future risks.[6]

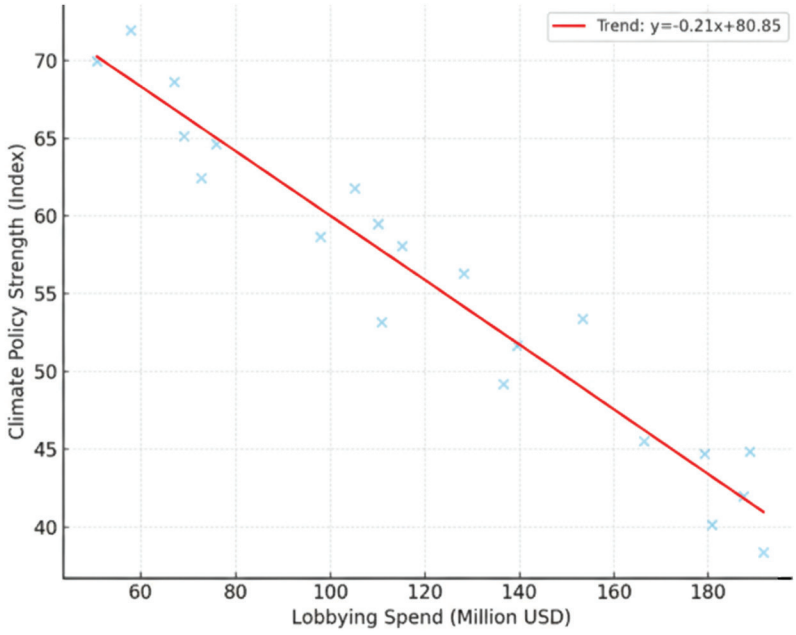

Fig 3 | Influence of lobbying on climate policy

Note: Conceptual illustration based on the literature; not based on original data.

Source: Author's own conceptual illustration of lobbying influence on climate policy outcomes, based on Brulle[5] and Aklin and Urpelainen[6]

The Collective Action Problem

Climate change is an archetypal global public goods problem, as emphasized in the literature on collective action and common-pool resource governance.[22] Climate stability is a non-excludable and non-rivalrous good that creates a strong "free-riding" problem. National governments might be tempted to make other countries share the cost burden of cutting emissions while enjoying the global benefits of mitigation themselves.[13,46] The Paris Agreement tries to remedy this situation with the use of NDCs through transparency and international public pressure, rather than through a centralized mechanism for enforcement.[47,48] Without a "climate club" reflecting broader coordination challenges in global climate governance,[23] or a better system for discouraging non-compliance, free-riding remains a major impediment to the necessary global coverage.[49,50] One proposed solution to the free-rider problem is the formation of "climate clubs," in which participating countries adopt coordinated carbon prices and impose penalties on non-members, thus creating incentives for broader cooperation.[51]

Vested Interests and Lobbying

The fossil fuel industry and its associated lobbies wield political power to maintain the status quo. Actors whose business models are centered on the consumption of carbon-intensive resources engage in strong lobbying to influence public debate and, hence, get the legislature to act in ways that delay action on climate change.[8,52] Such is the concentration that it can lead to political gridlock or formulate policies that are insufficient to address the scale of the challenge.[7,53]

Moreover, there is a strong incumbency effect in the global economy. This is because the infrastructure, human capital, and finance sectors of the economy are highly intertwined with fossil fuel production. Thus, transitioning from the current economy to a green economy is often viewed as high-risk. This is a source of resistance and must be addressed not only through carbon pricing but also through "green industrial policies" and a "just transition" strategy. The influence of these actors is illustrated in Figure 3.

Within the framework proposed in this article, these political-economy barriers primarily constrain the political-feasibility dimension of climate policy and interact with efficiency and equity. The mismatch between time horizons reduces the political acceptability of efficient policies, collective action problems limit the effectiveness of unilateral measures, and vested interests shape the distributive outcomes of policy design. Together, these constraints reinforce the need for integrated policy packages that explicitly consider political viability, economic efficiency, and social equity.

Bridging the Gap: Integrated Policy Solutions

Overcoming the gap between scientific urgency and political inaction requires more than the application

of isolated policy instruments; it demands a coherent and integrated policy framework.[7] The effectiveness of climate policy depends not only on economic efficiency but also on political viability and social acceptability.[11,12] This article proposes an integrated approach to climate policy design based on three interrelated dimensions: economic efficiency, social equity, and political viability. While individual instruments may perform well in one dimension, no single policy can simultaneously optimize all three. Therefore, effective climate governance requires a complementary set of policies that balance these trade-offs.

The following subsections present essential policy instruments and illustrate how they contribute to the different dimensions of this framework.

Carbon Dividend and Revenue Recycling

One of the main political challenges of carbon pricing is its potentially regressive impact, since low-income households typically spend a larger share of their income on energy. The carbon dividend approach addresses this issue by redistributing carbon pricing revenues to citizens through equal, lump-sum transfers.[48,54] This mechanism mitigates the increase in energy costs while preserving the price signal needed to incentivize emissions reductions. By transforming a carbon tax into a visible financial benefit, the policy increases social equity and public acceptance. Within the proposed framework, carbon dividends primarily address the equity dimension of climate policy while reinforcing the political viability of carbon pricing.

Strategic Investment and Industrial Policy

Market-driven innovation, on its own, may not occur at the speed necessary to support the climate transition. Green industrial policy, therefore, plays a crucial role in addressing innovation-related market failures by supporting research and development and facilitating the deployment of emerging clean technologies.[14,50,55] Public investment in areas such as smart grids, energy storage, and green hydrogen helps create the infrastructure and market conditions necessary for private investment to follow. Furthermore, this approach reframes climate policy, shifting the narrative from economic costs to economic opportunities, emphasizing job creation and industrial competitiveness in the emerging low-carbon economy. Within the proposed framework, industrial policy primarily contributes to political viability by reducing resistance to climate action and accelerating structural transformation, while supporting long-term efficiency gains through technological change.

International Cooperation and Border Carbon Adjustments

Climate change represents a global collective action problem, in which countries face incentives to free-ride on others' mitigation efforts without contributing to the positive outcome. At the same time, unilateral climate policies can lead to carbon leakage, as companies relocate production to jurisdictions with more lenient environmental regulations. Border Carbon Adjustments (BCAs) have emerged as a policy instrument to address both challenges, imposing a carbon-related tax on imports based on their embodied emissions.[32,36] This mechanism aims to level the playing field between domestic and foreign producers while maintaining incentives for reducing global emissions. A prominent example is the European Union's BCA Mechanism, which represents one of the most advanced implementations of this approach.

Within the proposed framework, BCAs contribute to both efficiency and policy viability, reducing carbon leakage and strengthening incentives for international coordination. However, its implementation raises significant challenges related to measurement, trade rules, and geopolitical tensions.

A comparison of climate policy instruments highlights the trade-offs inherent in their design. As Table 3 shows, the choice between carbon taxes and emissions trading systems reflects a fundamental distinction between price certainty and emissions certainty, as well as differences in administrative complexity and political feasibility.

Taken together, these policy instruments illustrate the central insight of the framework proposed in this article: effective climate policy cannot rely on isolated measures, but requires coordinated policy packages that balance economic efficiency, social equity, and political viability. Carbon pricing provides the necessary price signal, redistribution mechanisms increase social acceptability, and industrial and international policies address structural and coordination constraints. This integrated approach offers a practical basis for designing climate policies that are both theoretically sound and politically viable.

Table 3 | Comparison of key economic characteristics of carbon tax and cap-and-trade systems

Metric	Carbon Tax	Cap-and-Trade
Emissions Certainty	Variable; emissions outcome depends on the price elasticity of demand for carbon-intensive goods.	High: the system provides a hard cap on total emissions, guaranteeing a specific reduction target.
Price Certainty	High; the tax rate is set and increases predictably over time.	Variable: the price of allowances is determined by market forces, leading to price volatility.
Administrative Complexity	Relatively low; the tax can be integrated into existing tax structures.	High: requires a robust system to monitor emissions, distribute allowances, and operate a trading market.
Political Feasibility	Often faces strong political opposition due to its direct and visible costs to consumers.	It can be more politically palatable, as the price is less direct and often seen as a market solution, but the complexity can be a hurdle for public understanding.

Source: Author's own elaboration based on Goulder,[4] Pizer,[12] and Keohane.[11]

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Conclusion

The challenge of translating scientific urgency into effective climate policies lies not in insufficient knowledge, but in implementation under economic and institutional constraints. While the theory of internalizing negative externalities, developed by Pigou[3] and Goulder,[4] provides a robust analytical basis, its practical application remains deeply controversial. In particular, the divergence between the Stern Report[16,56] and Nordhaus[15,18,28] reflects a fundamental tension in climate economics: how to value future damages relative to present economic costs.

More broadly, the literature highlights a persistent tension between market instruments and state intervention. While carbon pricing is often emphasized for its efficiency and simplicity,[9,10,37] other strands of the literature highlight the importance of strategic public investment and industrial policy to address innovation-related market failures.[13,14,44,49] Similarly, the challenges of international coordination identified in the literature.[21,25] have led to policy proposals such as BCAs,[32,36] aimed at addressing carbon leakage and strategic behavior across jurisdictions.

Taken together, these perspectives point to a clear conclusion: no single policy instrument can achieve the scale and speed of transformation required. Carbon pricing alone is insufficient; subsidies alone are inefficient; and industrial policy alone is incomplete. Effective climate governance depends instead on the design of integrated policy packages that combine price signals, redistribution mechanisms, and strategic investments, explicitly accounting for political and institutional constraints.[5–8]

This article has argued, based on a synthesis of the literature, that such policy design should be guided by the joint consideration of three interdependent dimensions: economic efficiency, social equity, and political feasibility. These dimensions are not independent objectives, but mutually restrictive conditions that shape the success or failure of climate policy. Ignoring any of these risks produces policies that are economically inefficient, socially regressive, or politically unsustainable. Ultimately, the persistence of the gap between scientific urgency and political action reflects not a lack of available solutions but the difficulty of implementing them in politically restrictive environments. Overcoming this gap, therefore, requires moving beyond debates over individual instruments and adopting a more pragmatic approach that focuses on policy integration and institutional design. The main challenge of climate policy is no longer identifying what should be done, but rather designing policy frameworks that make sustained action politically and economically viable.

The contribution of this article lies in developing an integrated conceptual framework that systematically links economic efficiency, social equity, and political viability as determinants of climate policy formulation. By organizing existing theoretical and empirical perspectives around these interdependent constraints, the article provides a structured basis for analyzing the trade-offs and complementarities between different policy instruments. This approach transcends fragmented discussions of individual policies and offers a coherent framework for understanding why effective climate action requires coordinated policy packages rather than isolated measures. In this sense, the main challenge of climate policy is not to identify available solutions, but rather to design integrated frameworks that make sustained action both politically and economically viable.

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