The Enduring Credibility Challenge of Long-Term Global Environmental Policy

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Abstract

This article marks the twenty-fifth anniversary of *Global Environmental Politics* (*GEP*) by conducting an extensive review of the scholarship on long-term global environmental policy, with a particular focus on climate change. Drawing on articles published in *GEP* and twenty political science and interdisciplinary journals, we identify three key research themes: the persistent problem of time inconsistency and credible commitment, the rapid rise of net-zero targets and long-term low emissions development strategies, and a shift from analyzing climate mitigation as an international collective action problem toward framing it as a distributive-conflict problem within domestic economies. Building on these themes, we outline four open research challenges for the long-term environmental policy community—ranging from assessing long-term targets and policy instrument mixes to designing intergenerational compensation schemes—that may guide future research and improve the practical design of credible climate and environmental policy.

Keywords: Long-term policy, climate policy, credible commitment, time inconsistency, redistributive policies, global environmental politics, research challenges

Many global environmental political challenges are of a long-term nature, with actual performance often lagging behind the aspirations espoused in global environmental agreements. More than thirty years ago, the climate change, biodiversity, and desertification conventions and the forest principles were signed at the 1992 Río "Earth Summit"; however, none of these four policy challenges appears "resolved."[4] The question is not whether these global environmental agreements have effectively solved the problems that prompted their creation

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but whether the *long-term* nature of this subgroup of global environmental challenges affects our chances of successfully mitigating them.

An initial effort to grapple with this question was undertaken in *Global Environmental Politics'* (*GEP*'s) special issue "Long-Term Environmental Policy: Origins, Institutional Design, Prospects" (*GEP* 9 [3]), which examined the theoretical, analytical, methodological, and substantive dimensions of long-term environmental policy challenges in 2009. Building on that foundation and the expanding research on long-term policy, this article revisits the topic of long-term environmental policy, offering a novel analysis of the field's evolution over the past fifteen years and identifying critical areas that merit further scholarly and practical attention.

Consistent with *GEP*'s focus, we concentrate on global environmental challenges and their long-term aspect. Given the breadth of the literature, we disproportionately emphasize long-term climate policy research, reflecting the prominence of climate change as both a paradigmatic and an intensively researched example of a persistent and complex global environmental politics problem (Underdal 2010).

Our analysis draws on a review of articles within *GEP* and twenty political science and interdisciplinary journals, employing a set of keywords that captured the concept of long-term (climate) policy with a substantive focus on rational policy design and empirical studies. Climate change—as a quintessential long-term policy challenge—offers a revealing lens through which to assess not only efforts toward progress but also the enduring roadblocks to durable long-term policy solutions. Historically, long-term climate policy was characterized by inadequate mechanisms to secure credible commitments and a lack of clarity in global targets, particularly in the decades leading up to the 2015 Paris Agreement on Climate Change. The Paris Agreement marked an important shift by establishing global long-term goals and encouraging the adoption of long-term low emissions development strategies (LT-LEDS). It signaled a growing effort to align short-term national policies with more ambitious long-term objectives—as well as periodic reviews thereof.

Whereas long-term policies have the potential to enhance cost effectiveness and time consistency, they can inadvertently lead to unintended consequences, such as the "Green Paradox" (see later). They also face significant challenges tied to domestic political dynamics, economic disruptions, and reliance on yet unproven technologies. Recent climate politics scholarship has shifted its focus away from collective international diplomacy toward navigating domestic distributive conflicts. Our review suggests that addressing these intranational dynamics requires long-term policies to include tailored societal compensation mechanisms, incremental implementation, and robust political coalitions capable of balancing the interests of affected industries, workers, and voters.

Still, formidable questions remain. Crafting effective and equitable policies, ensuring greater transparency and accountability of climate targets, and mitigating the influence of entrenched political and economic interests present

complex credibility challenges that governments must overcome. This article seeks to illuminate these persistent questions and contribute to advancing the global discourse on achieving credible long-term climate and environmental commitments. By examining the evolution of the literature on long-term climate policies, this article not only offers insight into how far the field has advanced but also highlights critical areas where progress is needed to address persistent global environmental research challenges.

This article is organized as follows. In the next section, we revisit the definition of long-term policy challenges and outline the scope of our review. The subsequent section proceeds with the literature review, which identifies three central themes: the credibility and time-inconsistency problems of long-term policies, the emergence and effectiveness of international long-term climate policies, and a shift from analyzing long-term climate policy as an international cooperation problem to a problem of distributive politics. In the fourth section, we propose a set of unresolved research questions that should be addressed to inform effective long-term environmental policy design. We end with concluding observations.

Definition and Body of Literature Assessed

Global environmental problems can generally be categorized as either short or long term in nature. To delineate between these temporal dimensions, Sprinz (2009, 9) originally defined long-term policy challenges as

> public policy issues that last at least one human generation, exhibit deep uncertainty exacerbated by the depth of time, and engender public goods aspects both at the stage of problem generation as well as at the response stage.

The first component—time horizon—emphasizes the multidecadal nature of such challenges, during which adverse external effects persist in the absence of successful policy interventions and contrasts it with short termism (e.g., Boston 2017; Gheuens 2025; Jacobs 2011). Addressing these issues requires persistent, marathon-like policy efforts. For instance, transitioning from a fossil fuel–based energy system to one that relies primarily on renewable energy sources, halting biodiversity loss, and restoring severely degraded natural ecosystems each exemplifies the extended timescales inherent in tackling long-term environmental challenges (see also Sprinz 2014, 2023).

The second component highlights the deep uncertainty that surrounds long-term challenges, including the difficulty of forecasting future developments and the effectiveness of policy measures over extended horizons in reaching the purported goal. For example, uncertainty looms over whether a global transition to net-zero carbon emissions is achievable by 2050 or whether it is possible to halt biodiversity loss in the foreseeable future. A considerable literature has shaped research on robust adaptive planning to deal with deep uncertainty

(e.g., Lempert 2002; Lempert et al. 2003; Lempert and Collins 2007; Lempert et al. 2024; Lempert et al. 2009; Marchau et al. 2019), and the Society for Decision Making Under Deep Uncertainty facilitates methodological development, policy applications, and training.[5] At the most abstract level, simulation models are used to assess parameter spaces of interest permutatively so as to link short-term decision options to clusters of subsequently (un)reachable goal achievement corridors, thereby allowing for specifying which near-term choices are aligned with reaching specific long-term policy goals.

The third component encapsulates the problems of negative external effects of economic activities in the case of nonintervention and the challenge to create a collective response by a sufficiently large group to allow for substantial amelioration of the long-term policy challenge. The challenge of collective action (e.g., Olson 1971; Underdal 2010) is often evident both internationally and nationally, as many global climate political agreements and much of the national variation (including time-inconsistent behavior by, for example, Australia and the United States) attest to.[6]

In the same special issue of *GEP*, Stone (2009, 40) distinguished long-term policy challenges from other public policy challenges by emphasizing the collective goods aspect of their provision as "uncertain outcomes with risks that vary across individuals." Stone argued that those most affected by these problems often lack the power to shape their outcomes, whereas those less directly exposed may be reluctant to act, given the asymmetric distribution of environmental risks and vulnerabilities. To mitigate this gap, Stone advocated delegating the resolution of long-term challenges to (international) experts and institutions with risk-averse preferences (see also Lockwood 2021). These actors, Stone argued, may be better positioned to prioritize the long-term collective good over short-term national or individual interests—a perspective we will revisit later in this contribution (see its third and fourth sections).

Applying a set of keywords[7] closely associated with the definition of long-term (climate) policy outlined earlier, we reviewed the twenty-one journals listed in Table 1 for the period 2009–2025. We first selected eleven leading interdisciplinary journals thematically focused on climate and environmental politics to ensure comprehensive coverage of relevant empirical studies on long-term climate policies. We then selected ten leading political science and international relations journals with a broader scope to integrate more generalist insights on climate policy, credible commitment, and time-inconsistent decision-making. Although our journal selection involved subjective judgment and was not exhaustive, we believe that the twenty-one selected journals give a fairly representative picture of the major theoretical and empirical developments

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5. https://www.deepuncertainty.org, last accessed January 30, 2026.
6. See also the section Major Themes in the Literature on Long-Term Climate Policy, on distributive conflict.
7. To qualify for inclusion, not only did the search terms have to be matched but also the substantive contents of the articles had to deal with the subject matter in some depth.

Table 1

Journals Included in the Review

Journal	No. of Articles
American Journal of Political Science	3
American Political Science Review	5
British Journal of Political Science	2
Comparative Political Studies	3
Climatic Change	2
Climate Policy	9
Earth Systems Governance	2
Environmental Politics	3
Environmental Research Letters	2
European Journal of International Relations	0
Global Environmental Change	3
Global Environmental Politics	8
International Environmental Agreements: Politics, Law, and Economics	1
International Organization	4
International Studies Quarterly	2
Journal of Environmental Economics and Management	5
Journal of Politics	3
Nature Climate Change	10
Review of Environmental Economics & Policy	2
The Review of International Organizations	2
World Politics	1
Total	72

The journals were preselected. Specific articles were chosen on the basis of searches for *climate neutrality, credible commitment, credibility, future generations, long-term targets, long-term policy, time (in)consistency, time horizon,* or *net zero*. In the generalist journals, we also searched for "climate policy" and "climate commitment" to ensure comprehensive coverage.

in research on long-term climate policy. On the basis of the emerging themes from the review, we also complemented the discussions with relevant insights from select books and other journals, and we integrated studies of short-term climate policies where appropriate. Given our focus on rational policy design, we largely excluded normative political theory contributions and prioritized generalizable frameworks and empirical findings over case-specific studies.

GEP, *Nature Climate Change*, and *Climate Policy* published the most journal articles on the topic of long-term climate (and environmental) policy problems over the assessed time period (see Table 1).

Major Themes in the Literature on Long-Term Climate Policy

General Developments

The challenge of steering long-term policies was eloquently characterized by Kydland and Prescott (1977) and coined *time inconsistency* (sometimes also called *intertemporal inconsistency*); in political science, the term *credible commitment* is used more prominently. Building on Kydland and Prescott, Underdal (2010, 387) defined *time inconsistency* as "a situation in which an actor's best plan for some future period of time will no longer be optimal when that time actually arrives." The future cannot bind the present. In anticipation of potential noncompliance in the future, *present* behavior is incentivized to abstain from rule conformity. To solve this conundrum, scholars have advised "depoliticizing" strategies involving (semi)automatic policies and policy delegation, i.e., the adoption of rule-based decisions (such as an inflationary goal for a central bank or a long-term goal like the 1.5° to 2°C goal in climate policy) combined with the creation of a body detached from everyday politics that autonomously pursues the overarching goals originally set by political decisions (Stone 2009). Whereas central bank autonomy has become the hallmark of monetary institutional design in many economies over the past decades, the delegation of decision-making authority to experts (Koskimaa et al. 2021) has generally been much lower in the cases of global climate and biodiversity policies. Even the EU has never managed to create autonomous regulatory institutions on climate and the environment.

Over the last twenty years, a range of modeling studies have assessed how to align short-term decisions with long-term political outcomes, for example, the ability to limit the rise of global mean temperature change over preindustrial levels to 1.5° to 2°C (del Río González 2008; Isley et al. 2015; Lempert et al. 2024). The general finding is that near-term political choices impact the feasible set of long-term outcomes. A clear implication from many studies of long-term climate policy is that starting to constrain emissions early in time widens the probability of achieving desired long-term goals (IPCC 2018; Kriegler et al. 2018), which reverberates with news that the 1.5°C goal is about to be surpassed in the near future and that substantial additional efforts are needed to limit global mean temperature rise to 2°C. On the downside, missing out on early emissions reductions of greenhouse gases increases the long-term chances of noncompliance with long-term policy goals (by way of involuntary noncompliance) (Perrissin Fabert et al. 2014). Furthermore, to achieve ambitious long-term goals, niche markets should be created to allow for future effective and

efficient technologies to deliver emission reductions that present technology cannot achieve or can achieve only at undue costs (del Río González 2008).

Emerging Long-Term Climate Goals and Their Potential Effectiveness

Climate change is a quintessential long-term policy challenge where the lack of credible commitment mechanisms has impeded progress domestically and internationally (Aeschlimann 2025; Brunner et al. 2012; Finnegan 2022; Hovi et al. 2009; Kalk and Sorger 2023). Historically, international climate negotiations have rarely operationalized long-term targets. For example, the UNFCCC set an ambition to stabilize GHG emissions "at a level that would prevent dangerous anthropogenic interference with the climate system"[8] but did not specify the means or timeline for achieving this objective. After years of negotiations, however, the 2015 Paris Agreement marked an important shift by setting global targets, including the goal to achieve "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century,"[9] as well as encouraging countries to develop LT-LEDS to align with this goal. Undoubtedly, the agreement has, since 2015, prompted a global wave of long-term climate policies, including framework laws (Averchenkova et al. 2024), net-zero targets (Hans and Kuramochi 2022), and LT-LEDS.

Long-term climate policies, such as net-zero targets and LT-LEDS, can enhance policy effectiveness and cost efficiency compared to short-term approaches (Falduto and Rocha 2020; Hans and Kuramochi 2022; Stolper et al. 2024; Vogt-Schilb and Hallegatte 2014). Höhne et al. (2021), for example, found that the recent surge in net-zero targets opens a window for achieving the Paris Agreement's temperature goals, marking a potentially significant improvement over the shorter-term nationally determined contributions. Longer time horizons enable greater emissions reductions by supporting the deployment of high-cost, high-potential technologies like offshore wind power. Long-term policies can also reduce the risk of backsliding, ensuring continuity in climate objectives (Averchenkova et al. 2021); send important credibility signals to investors that contribute private capital toward climate mitigation objectives (Dolphin et al. 2023); and align short-term actions with long-term goals, thereby lowering overall mitigation costs (del Río González 2008; Vogt-Schilb and Hallegatte 2014).

Despite being generally cost efficient compared to short-term policies, long-term climate policies can sometimes generate unintended economic incentives—especially if they include provisions to gradually strengthen

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8. UN Framework Convention on Climate Change, 1992, Article 2, available at: https://unfccc.int /resource/docs/convkp/conveng.pdf, last accessed January 30, 2026.
9. UNFCCC, Decision 1/CP.21: Adoption of the Paris Agreement (FCCC/CP/2015/10/Add.1), Article 4.1.

regulations over time. The Green Paradox of long-term policy arises when the announcement of future climate policies, such as carbon taxes or emission caps, prompts fossil fuel producers to ramp up extraction and emissions *now* to maximize profits before stricter rules apply *in the future* (Jensen et al. 2015). Stringent long-term policies that involve reducing future resource rents, such as net-zero targets, can, in theory, amplify this effect, especially in contexts where fossil fuel producers have flexible extraction capacities. However, existing empirical research indicates that factors like high long-term extraction costs, limited short-term capacities, and specific policy tools (e.g., renewable energy subsidies) often mitigate the Green Paradox (Jensen et al. 2015).

Recent studies suggest that fully implemented LT-LEDS could limit global warming to just below 2°C (Meinshausen et al. 2022; van de Ven et al. 2023), although many of these long-term plans presently exhibit systematic GHG inventory issues and ambiguities (Buck et al. 2023; Green et al. 2025; Herman 2024). The Net Zero Tracker[10] belongs to the few efforts to systematically collect information on net-zero goals of countries, larger companies, and subnational actors (regions, cities) as represented in the scholarly literature (Green et al. 2025; Trouwloon et al. 2023). Drawing on findings from the Net Zero Tracker, Green et al. (2025) identify major ambiguity problems across net-zero targets of these actors, relating to target characteristics such as the timing of targets, policy/legal status, and governance mechanisms. Tørstad and Wiborg (2024) show why such ambiguity in climate targets raises major credibility problems, including that it renders compliance accountability and enforcement difficult. Lieberman and Ross (2025) similarly argue that clear measurements of governmental climate commitments, actions, and outcomes are crucial both for holding politicians accountable and for sustaining international cooperation. Jointly, the LT-LEDS inventory issues and information deficiencies suggest that a stronger transparency mechanism for ensuring more informationally coherent and methodologically robust LT-LEDS is warranted under the Paris Agreement, especially because the agreement does not contain strong material enforcement mechanisms (see also McAllister and Schnakenberg 2022).

Apart from the lack of a strong international system for ensuring methodological and informational coherence, the credibility of LT-LEDS also remains a challenge owing to the time-inconsistency problem in domestic politics, where governments may abandon commitments when they become politically inconvenient (Hovi et al. 2009; Kydland and Prescott 1977). Factors like rising abatement costs (Iyer et al. 2018), overreliance on negative emissions through forest carbon offsets (Moioli et al. 2025) and yet-to-be-scalable technologies like carbon removals (Fankhauser et al. 2022), interest group pressures (Hagen and Schopf 2024; Kalk and Sorger 2023; Kalkuhl et al. 2020; Mildenberger 2020),

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10.   https://zerotracker.net/, last accessed January 30, 2026.

myopic citizens (Healy and Malhotra 2009), anticlimate shifts in public opinion (Finnegan 2022; Gazmararian et al. 2025; Gheuens 2025; Jacobs and Matthews 2017), high electoral competition (Finnegan 2023; Melnick and Smith 2025), or unexpected crises like wars or pandemics (Genschel et al. 2025) can undermine long-term commitments.

Comparative politics and international relations research further indicates that certain country characteristics are associated with more credible long-term policies than others are. The most obvious characteristic is state capacity (Bertram et al. 2024; Cao and Ward 2015; Fernández-I-Marín et al. 2024; Fransen et al. 2023; Meckling and Nahm 2021; Tørstad et al. 2025), which in this context can be understood as governmental ability to enact and execute short-term policies that align with long-term goals (see earlier). Besides state capacity, there is a long-standing debate on whether democracies or autocracies produce the most credible climate policies (Bernauer et al. 2025; Povitkina 2018; Victor et al. 2022). There are sound theoretical reasons to expect more credible long-term climate policies in democracies (Tørstad and Wiborg 2024) because they typically possess stronger accountability mechanisms in the form of elections, independent courts (Voeten 2025), free media, and NGOs. The empirical record also shows that democracies, on average, generate stronger climate policy outputs than autocracies in terms of adopted mitigation measures, in laws and institutions, and in their commitments to international treaties and engagements in international negotiations (Lindvall and Karlsson 2024). The effects of regime type on specific climate policy performance indicators are more scattered. Bayer and Urpelainen (2016) found a strong association between democratic regime type and renewable feed-in tariffs, whereas Sanford (2023) found that both competitive elections and democratization transitions are associated with higher deforestation rates. Mahdavi et al. (2022) found that intertemporal variation in fossil fuel taxes and subsidies of 157 countries was driven by a country's revenue needs rather than regime type or domestic political institutions. Dilorenzo and Stone (2022) demonstrated that democratic leaders facing binding term limits tend to sign fewer international environmental agreements, and von Stein (2022) found that civil liberties are associated with better environmental outcomes, whereas free and fair elections are associated with worse outcomes. She argued that the impact of elections and civil liberties on environmental outcomes is conditioned on public opinion and on which actors within society hold power.

In line with this argument, there is a large literature examining the public opinion foundations of credible climate policy across countries, based on the assumption that mass public support is key to the political feasibility of climate policy (Beiser-McGrath et al. 2021; Gazmararian 2025; Schönhage et al. 2024). Public opinion can influence the credibility of long-term climate policy, inter alia, by shaping politicians' anticipation of voter responses and, through elections driven by climate preferences, determining the types and priorities of leaders over time (Gazmararian et al. 2025). Evidence of how public opinion

matters for long-term climate policy credibility is scarce, but the relationship likely varies greatly across contexts.[11]

Comparative politics research has also begun disentangling how specific political institutions within democracies, such as electoral rules and institutions of organized interest mediation, promote the credibility of long-term climate policy. Arguing that politicians need insulation from electoral backlash and the capacity to overcome powerful and organized incumbent industries that will bear the costs of decarbonization, Finnegan (2022) found that countries with proportional electoral rules and higher concertation between industry and the state invest more in climate policy. On the other hand, others warned that corporatism can impede climate policy (Mildenberger 2020). Analyzing Finland, Vesa et al. (2020) proposed that corporatism in this country has institutionalized a practice whereby a narrow coalition of economic interest organizations collaborates with like-minded ministries to influence climate policy from the inside.

Economic interest groups have also featured prominently in the recent political economy literature, which has focused on how firms' policy preferences and industrial lobbying relate to (long-term) climate policy. Recent contributions have nuanced the traditional insight that the fossil fuels sector is uniformly detrimental to long-term climate policy (e.g., Colgan et al. 2021; Vormedal et al. 2020) and instead examined how firm-specific factors like adjustment costs, trade exposure, and supply chain linkages drive preferences for or against regulation. Kennard (2020) explained why some firms lobby for costly climate regulations despite globalization's competitive risks, arguing that heterogeneity in adjustment costs induces low-cost firms to support policies that shift market share from high-cost domestic rivals. Similarly, Genovese (2019) contended that the preferences of firms for international climate cooperation are not determined solely by abatement costs but are contingent on trade exposure: High-emission sectors with substantial trade integration exhibit heightened opposition because of competitiveness threats, whereas low-emission, trade-exposed sectors favor cooperation owing to their regulatory adaptability.

On the effects of lobbying, Kalkuhl et al. (2020) showed that political pressures from fossil fuel lobbies can lead to a binary policy outcome: either a zero-carbon tax or a prohibitive tax that eliminates fossil investments. This "all-or-nothing" dynamic arises because rational businesses anticipate government deviations, rendering intermediate policy choices unsustainable. Kalk and Sorger (2023) extended this insight by modeling how political pressure from both polluting sectors and green advocates influences policy. Surprisingly, pressure from polluters can *increase* clean-energy investments by shifting the long-term energy mix toward renewable energy as governments seek to balance

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11. Our keyword search for long-term policy was not designed to comprehensively cover the large public opinion literature on climate policy support (for a meta-analysis, see Bergquist et al. 2022).

competing interests. On the other hand, Cory et al. (2021) empirically showed that anticlimate policy lobbying extends well beyond the traditional coalition of fossil fuel companies. Supply chain linkages create an "extended carbon coalition" of upstream suppliers and downstream customers exposed to decarbonization costs. Drawing on data on coalition memberships, lobbying records, and input-output-based carbon intensity measures, the study counterintuitively found that firms outside the highest-emitting industries drive most anticlimate lobbying activity in the United States. Finally, Hagen and Schopf (2024) analyzed the role of industrial lobbying in the context of carbon border adjustments, finding that the allocation of carbon tax revenues is crucial for their effectiveness. When revenues are returned to households, emissions are poised to increase because of industrial lobbying on the size of the carbon tax (since the industry wants to reduce the tax burden and increase the commodity price). Conversely, redistributing tax revenues to firms can expand the supportive coalition, leading to reduced emissions. Thus an emerging policy implication is that returning some tax revenues to firms on the "inside" of carbon border adjustment mechanisms is essential to aligning the lobbying efforts of companies with effective long-term climate policy.

Shift from Collective Action to Distributional Issues

A macro-trend in the studies that examine long-term climate policy credibility is a shift from an analytical focus on climate change mitigation as an international collective action problem toward a focus on variations in domestic-level climate politics, where climate mitigation is increasingly framed as a problem of distributive conflict between the "winners" and "losers" of a green energy transition. Early contributions to the long-term climate policy literature predominantly analyzed the international level and viewed governmental temptations to freeride on the efforts of others as the key barrier to long-term credibility (e.g., Hovi et al. 2009). Yet, in the wake of the Paris Agreement—which relies mainly on a "bottom-up" logic—scholars have increasingly begun to question whether policymakers empirically view climate mitigation as a collective action problem (Aklin and Mildenberger 2020). Instead, the distributive-conflict perspective suggests that domestic conflicts between pro- and anticlimate reform interests primarily shape the climate policies of governments (Aklin and Mildenberger 2020; Colgan et al. 2021; Hughes and Urpelainen 2015). Following this perspective, the structural composition of a country's economy and the distribution of "green" and "brown" interest groups in society—encompassing voters, workers, industries and firms, political parties, and advocacy coalitions—play critical roles in determining the outcomes of these conflicts. The relative influence of "brown" fossil fuel versus "green" technology interests shapes the strength of opposition to climate measures, with clean-energy advocates gaining traction when their political and economic clout surpasses that of traditional energy sectors (Meckling et al. 2015). Moreover, "green" governments can use

positive reinforcement mechanisms to strengthen green interest groups and lock in long-term policy commitments, whereas "brown" governments can strategically underprovide support for renewable energy to undermine green interest groups (Aklin and Urpelainen 2013).

Similarly, Urpelainen (2012) set up a game-theoretic model with green and brown governments that sheds analytical clarity on the distributive-conflict perspective. If a "green" government fears that it will be replaced by a "brown" government, it will initiate stronger green policies than it will under an expectation that it will not be replaced in the second period. In addition, "green" governments will choose more ambitious early-period emission reduction goals if the probability of disruptive environmental impacts increases. This formal model may point to the tug-of-war we presently witness over ambitious long-term environmental policies, for example, in the case of the net-zero backlash in the United Kingdom as fears of electoral replacement steer more extreme (anti) environmental policies by the respective opponents. The main driver, however, is that neither the "green" nor the "brown" government can bind its successors in the *very* long run, thereby having difficulties in enabling time-consistent decision-making because of changes in electoral sentiment.

To improve the credibility of long-term climate policy, the distributive-conflict literature highlights the need to mitigate industry-specific and workforce-related impacts of long-term climate policies, such as stranded assets (Colgan et al. 2021), economic inequalities resulting from mitigation (Schönhage et al. 2024), and "carbon transition" costs for firms and people in climate policy-vulnerable sectors (Gaikwad et al. 2022). A rapid transition to net-zero emissions will profoundly reshape national economies. In theory, the implications of time-consistent long-term climate policy are drastic, where optimal policy paths that avoid stranded assets require either a full fossil phaseout or no action (Kalkuhl et al. 2020). While rapid full fossil phaseouts remain unlikely in practice, more pragmatic long-term climate policies can be tailored to proactively mitigate emerging distributive conflicts, for example, by including accommodation or compensation strategies for adversely affected actors in domestic economies (Gaikwad et al. 2022; Srivastav and Rafaty 2023). Bolet et al. (2024) provided empirical confirmation of this idea, offering causal evidence that a redistributive "just transition agreement" led to electoral support among the affected Spanish coal workers. The study shows that stringent climate policies can be electorally successful among fossil fuel–dependent communities that would traditionally oppose such policies, provided they include redistributive policies targeted at those communities. Conversely, Colantone et al. (2024) showed that people affected by a ban on polluting cars in Milan—without any redistributive compensation—shifted to the populist party Lega.

Designing optimal compensation schemes to ensure credible long-term climate policies remains a complex, unresolved question with few generalizable solutions. Governmental redistributing choices toward domestic actors, such as households and firms, are an important policy design dimension. Sen and von

Schickfus (2020) found that investors increasingly factor in the risk of stranded assets, as seen in market reactions to Germany's coal phaseout proposals. They expect financial compensation that can inflate the costs of long-term climate policy. Delfgaauw and Swank (2025) showed that redistributive concerns—where policies like subsidies favor citizens investing in green technologies (e.g., solar panels, electric vehicles)—can both strengthen and weaken long-term climate policy commitment. When a majority of citizens spend money on green technologies, their political support can make policies sustainable without formal commitments, as seen in the case of the Dutch program for solar subsidies.[12] Conversely, when only a minority invests, governments may overcommit (e.g., Germany's twenty-year renewable energy price guarantees) to protect investors or avoid commitment altogether, the latter leading to inaction if policies seem inefficient or politically costly (Delfgaauw and Swank 2025).

Relatedly, Genovese and Tvinnereim (2019) empirically examined business preferences for the European Emissions Trading System (ETS)[13]—perhaps the EU's most important long-term climate policy instrument. Business support for the ETS varies, with high-emitting firms showing stronger support for the lenient early-stage ETS than do low-emitting firms. Opposition grows as the policy becomes stricter, particularly among high-emission firms considering disinvestment or relocation. These findings suggest that firm and sectoral emission profiles, alongside gradual policy implementation, shape corporate attitudes toward regulative long-term climate policy. Domestic compensation in the early stages potentially sustains policy continuity (Genovese and Tvinnereim 2019).

Overall, the distributive-conflict literature reveals several emerging subthemes and questions in long-term climate policy research. The key theme is the growing recognition that domestic political dynamics, driven by economic structures and redistributive concerns, significantly influence long-term policy credibility and outcomes. Studies highlight how policies must navigate tensions between fossil fuel and clean-energy sectors, with compensation mechanisms emerging as critical for sustaining support, especially in early policy stages (Genovese and Tvinnereim 2019; Srivastav and Rafaty 2023). However, unresolved questions include how to design cost-effective compensation schemes that balance credibility with flexibility and avoid locking in inefficient policies (Delfgaauw and Swank 2025; Sen and von Schickfus 2020). Another subtheme is the variability in policy outcomes across countries, driven by differing

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12. The Netherlands has a subsidy program that allows households with solar panels to offset the electricity they generate in the summer against their winter electricity consumption, effectively making the difference between the two seasons a subsidy for residential solar energy because electricity prices are higher in the winter. In 2023, despite proposals to abolish this subsidy because of reduced solar panel prices, the Dutch parliament chose to keep it, because many citizens had already invested in solar panels, and removing the subsidy would negatively impact them (Delfgaauw and Swank 2025).

13. See https://climate.ec.europa.eu/eu-action/carbon-markets/eu-emissions-trading-system-eu-ets _en, last accessed January 30, 2026.

expectations and investment patterns, which can lead to multiple equilibria—some with strong commitment, others with inaction (Delfgaauw and Swank 2025).

Select Research Challenges

The literature review identified three overarching clusters in long-term climate policy research: the persistent problem of time inconsistency and credible commitment, the global proliferation and effectiveness prospects of official long-term goals and instruments since the Paris Agreement, and the analytical shift from international collective action dilemmas to domestic distributional conflicts as barriers to sustained climate policy. Each of these trends points to unresolved empirical and theoretical questions that define the current research frontier. Four priority challenges that follow directly from these trends and merit concerted scholarly efforts in the coming years include the long-horizon effectiveness of policy mixes, policy packages, and official long-term instruments; propagation and mitigation of time inconsistency across governance levels and over electoral cycles; domestic country characteristics and political-institutional configurations that sustain credible long-term commitments; and design of intergenerational, intragenerational, and intranational compensation/redistributive systems to enhance the political feasibility of long-term goal achievement.

First, rigorous, long-horizon assessments of the effectiveness of policy mixes (e.g., Stechemesser et al. 2024), policy packaging (Rhein and Bernauer 2025), and the new generation of official long-term instruments (net-zero targets, LT-LEDS, framework climate laws) are needed. Most existing evaluations of policy instruments and instrument combinations still rely on short- or medium-term horizons (five to fifteen years). We lack systematic evidence on whether the instruments that have proliferated since 2015 can actually deliver credible, cost-effective, and politically resilient pathways across multiple electoral cycles and human generations. Dynamic, multidecadal evaluation frameworks are therefore urgently required. The contributions by Tobin et al. (2025), Hale (2024), Boston (2017), and Boston et al. (2021) provide useful guidance for this endeavor, including dynamic policy assessments.

Second, the time-inconsistency problem needs to be examined as a multilevel and cascading phenomenon. Postponement and backloading of ambition are widespread not only at the national level but also at subnational and city levels, creating risks of mutually reinforcing credibility failures across governance scales. We still understand too little about how lower-level delay undermines higher-level goals, which institutional mechanisms (automatic adjustment rules, delegated authorities, independent "climate banks," or carbon-removal agencies) can meaningfully bind successors (e.g., Frame and von Stein 2021), and the political conditions under which such mechanisms prove feasible and resilient to reversal.

Third, despite long-standing comparative climate politics research, many unresolved questions remain regarding the combination of domestic characteristics and political-institutional configurations (including state capacity, regime type, electoral rules, corporatist arrangements, public opinion dynamics, and interest group concertation) that best sustain credible, long-term environmental policy (Bernauer et al. 2025; Tørstad 2020; Victor et al. 2022). This debate interacts with the feasibility and effectiveness potential of policy instruments, spurring a range of subquestions concerning which countries are more likely to advance green technological solutions, join climate coalitions, or enforce long-term goals. Further disentangling how specific types of political institutions matter for the credibility of long-term climate policy will be an important research priority in the coming years, especially given the current global trend of democratic backsliding.

Finally, the distributive politics literature reviewed suggests that future research should address how to tailor policies to diverse economic and political contexts while ensuring equitable transitions for workers and industries affected by the shift to net-zero economies (Gaikwad et al. 2022; Srivastav and Rafaty 2023). Overall, proactive compensation mechanisms, gradual implementation, and alignment of policies with domestic contexts and green sector growth present promising opportunities to foster support for long-term climate policies. At the same time, lobbying by entrenched interests, inefficiencies in compensation schemes, and variability in the outcomes of green technology investments across countries remain significant barriers to long-term policy credibility. A contemporary analytical challenge for the distributive politics literature is that its findings are scattered across a range of specific empirical contexts. We still lack general principles for compensation schemes that are simultaneously politically feasible, fiscally sustainable over decades, and effective at preventing policy reversal or excessive dilution. Tying the context-specific findings from this literature to more general and coherent theoretical frameworks by way of a systematic review could result in a firmer understanding of scope conditions for both long-term climate policy challenges and their effective solutions.

Conclusions

This article set out to examine the challenge of credible, long-term global environmental policies with a particular focus on the rationalist and empirical literature on climate policy. We conducted a broad review of the literature on long-term climate policies, exploring the evolution of international and domestic governance mechanisms and the major obstacles that hinder their credibility. By revisiting key debates published in *GEP* and related journals over the past fifteen years, we identified enduring challenges alongside opportunities for more effective and equitable governance.

Our review highlighted three overarching clusters in the literature on long-term climate policy: first, the persistent problem of time inconsistency and the

challenge of credible commitment to long-term climate policy; second, the rise and effectiveness of long-term climate goals and instruments (such as net-zero targets and other LT-LEDS); and third, a shift in focus from collective international climate diplomacy to managing distributive conflicts within domestic economies.

Whereas this review has focused on rational policy design, it is crucial to acknowledge that even ingeniously designed long-term climate policies have inherent limitations. As VanDeveer et al. (2025, 259) observed, stable policy regimes are very difficult to sustain over time and will periodically unravel. Moreover, naively pursuing long-term policies as a "depoliticized" solution can inadvertently reinforce carbon lock-in rather than disrupting it (Bernstein and Hoffmann 2025). Under "existential" climate politics (Colgan et al. 2021), a degree of continuous climate policy "repoliticization" (Paterson et al. 2025) appears both inevitable and necessary—not only to weaken incumbent anticlimate forces and the extended carbon coalition (Cory et al. 2021) but to mobilize activists and empower green asset holders to ensure just and democratically legitimate net-zero transitions.

In conclusion, long-term climate policies are simultaneously gaining prominence and encountering new challenges at the domestic level. By focusing attention on the emerging domestic challenges of long-term policy, this article has identified a complex set of explanatory factors that affect the degree to which countries are likely to effectively align long-term ambition with actionable outcomes in the shorter run. Many important questions concerning the effectiveness of long-term policies and how these policies can create the institutional, social, and economic conditions necessary to credibly sustain them remain largely unanswered. To rectify this, we have outlined four broader research challenges that warrant attention in future global environmental politics research. Whereas the current macro-level political landscape—with democratic decline and a resurgence of military and economic conflicts—appears less conducive to addressing long-term environmental policies than it did a few years ago, the scientific rationale for studying and perhaps partially resolving long-term climate and environmental challenges has never been more compelling. It is thus crucial that global environmental politics scholars further sharpen their focus on these vexing research challenges to better inform public policy.

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