

How Countries Frame Their Climate Commitments: Explaining Cross-National Variation in
NDC Policy Implementation Specificity

Emma Klessig

A thesis

Submitted in partial fulfillment of the

requirements for the degree of

Master of Marine Affairs

University of Washington

2026

Committee:

Nives Dolšak, Chair

Aseem Prakash

Program Authorized to Offer Degree:

School of Marine and Environmental Affairs

© Copyright 2026

Emma Klessig

University of Washington

Abstract

How Countries Frame Their Climate Commitments: Explaining Cross-National Variation in
NDC Policy Implementation Specificity

Emma Klessig

Chair of the Supervisory Committee:

Nives Dolsak

Director of the School of Marine and Environmental Affairs, Stan and Alta Barer Professor in
Sustainability Science

School of Marine and Environmental Affairs

Despite near-universal participation in the Paris Agreement, current national climate commitments remain insufficient to achieve the 1.5–2°C warming target. This study examines what national characteristics explain variation in how countries frame their climate commitments within Nationally Determined Contributions (NDCs). Using automated text analysis of 93 NDCs submitted to the UNFCCC between 2020 and 2023, the study assesses seven linguistic dimensions of policy implementation specificity. An ordinary least squares (OLS) regression with country-specific political, social, and economic predictors reveals a consistent development divide: wealthier countries produce mitigation-oriented, unconditional NDCs, while less developed countries emphasize adaptation and frame commitments as contingent on external support. Fossil fuel energy share is a strong negative predictor of institutional specificity, suggesting that energy-sector political costs suppress detailed institutional commitments.

Democratic governance shows a marginal negative association with institutional specificity, consistent with the argument that established democracies need not explicitly signal governance capacity that is already credible to international audiences. Female political representation is positively associated with stronger commitment language. Together, these findings suggest that closing the ambition gap requires addressing the resource constraints that push developing nations toward conditional commitments and understanding how energy politics and institutional context shape how countries signal their willingness to act.

Table of Contents

1. Introduction	4
2. Literature Review.....	5
2.1 International Environmental Regime Implementation.....	5
2.2 Domestic Implementation Theory	6
2.3 Barriers to Climate Policy Implementation	8
3. Theoretical Framework	9
3.1 Political Factors	10
3.2 Social Factors.....	11
3.3 Economic Factors.....	12
3.4 Theoretical Integration and Hypotheses	13
4. Methods.....	15
4.1 Dependent Variables	15
4.2 Explanatory variables.....	17
4.3 Statistical Methods.....	18
4.1 Statistical Methods.....	18
4.4 Methodological Limitations.....	18
5. Results.....	20
5.1 Commitment Language Strength	22
5.2 Net Zero Commitment	22
5.3 Implementation Specificity	22
5.4 Conditional Commitments	23
5.5 Support Pledges	23
5.6 Policy Focus: Mitigation.....	23
5.7 Policy Focus: Adaptation	24
6. Discussion	24
6.1 The Developmental Divide in NDC Language.....	24
6.2 Democracy and Implementation Specificity	26
6.4 Commitment Language.....	28
6.5 Limitations	29
7. Conclusion	29

List of Figures

1. Figure 1: Theoretical Framework.....	16
---	----

List of Tables

1. Table 1 Descriptive Statistics.....	20
2. OLS Regression Results Part 1	21
3. OLS Regression Results Part 2.....	22

1. Introduction

In 2015, the Paris Agreement achieved something unprecedented in international environmental governance: near-universal participation. By allowing countries to determine their own commitments through Nationally Determined Contributions (NDCs), the agreement gained pledges from 195 parties under a shared framework with the goal of limiting global temperature rise to well below 2°C above preindustrial levels. However, current national climate commitments remain critically insufficient. Under present policies, the world is projected to reach up to 2.8°C of warming, and even if all existing NDCs were fully implemented, it would still result in approximately 2.5°C, which is well above the Paris Agreement's targets. To align with a 2°C pathway, countries would need to deliver roughly three times the emission reductions currently pledged, and approximately five times as much to stay on a 1.5°C pathway (UNEP, 2025). Understanding the variation between pledge and action is essential because how countries structure and communicate their NDCs shapes whether those commitments translate into real policy. Therefore, this study asks: what national characteristics explain the variation in how countries frame their climate commitments in NDCs?

This study uses automated text analysis and regression modeling to assess whether political factors (democratic governance, freedom of expression), social factors (gender representation), and economic factors (GDP, trade openness, energy profile) explain the variation in the policy implementation specificity of NDC documents. These factors are compared across seven linguistic dimensions: commitment language strength, net-zero commitments, institutional specificity, conditional commitments, support pledges, mitigation focus, and adaptation focus, and reveal that NDC language systematically reflects national structural conditions. Overall, a clear development divide emerges where wealthier democracies use less conditional language and focus more on mitigation, while less developed countries frame commitments as reliant on external support and prioritize adaptation.

The analysis utilizes 93 NDC documents submitted to the United Nations Framework Convention on Climate Change (UNFCCC) between 2020 and 2023, and country-specific variables are sourced from established indices, including V-Dem, World Bank, UN, and IEA data, using 2019 figures. Linguistic analysis was conducted on all 93 documents; however, due to limited data availability, country-specific explanatory variables were not available for all

countries and therefore resulted in a reduced regression sample of 69. The analysis demonstrates that economic development status consistently shapes how countries frame their NDC language. Specifically, countries with higher GDP per capita produce mitigation-oriented, unconditional NDCs, and less wealthy countries emphasize adaptation needs and conditional commitments. Democratic governance and female political representation also appear to be theoretically significant predictors. The following section reviews theoretical perspectives on policy implementation and climate governance, followed by the theoretical framework, methods, results, and discussion.

2. Literature Review

There is a distinct body of literature that examines how international environmental regimes shape national behavior. Below, both international and domestic implementation theories are examined to explain the institutional, social, economic, and political mechanisms through which national climate commitments are developed and communicated. Taken together, these perspectives reveal the complexity of implementation and the need for each of the components in this study.

2.1 International Environmental Regime Implementation

International environmental implementation scholarship states that participation in global agreements involves far more than domestic preferences. Young (2011) discusses research showing that international environmental agreements can actually shape state behavior. However, when participating in governance, effectiveness depends on the design, legitimacy, and compatibility of those frameworks with domestic institutions and not just enforcement (Young, 2011). In the context of this study, it suggests that variation in how countries respond to the same international agreement cannot be explained by design alone but requires attention to the national characteristics that shape whether commitments translate into domestic action.

Many scholars in this field argue that compliance with international environmental commitments stems more from perceptions of legitimacy and state capacity and less from external coercive pressure, such as sanctions or legal consequences. Chayes and Chayes (1996) argue that noncompliance typically reflects capacity constraints and ambiguity rather than intentional noncompliance (Chayes and Chayes, 1996). This suggests that the language countries

use to frame their commitments may signal both their institutional capacity and their good-faith engagement with international norms. This perspective helps explain why NDC language, which establishes shared standards for domestic behavior and communicates institutional readiness, may be significant across all countries regardless of whether commitments are legally binding.

Recent research on the Paris Agreement by Victor et al. (2022) examines the credibility of national climate policy experts and finds that the quality of national political institutions is the largest predictor of whether a country's pledges are perceived as credible. Institutional quality here refers to a government's political and administrative capacity to actually implement what it commits to and encompasses factors such as the rule of law, government effectiveness, and control of corruption. Countries with strong institutions are therefore seen as more capable of following through on their pledges, which explains why bolder commitments tend to come from the same countries deemed most credible — not despite their ambition, but because their governance structures make that ambition believable (Victor et al., 2022). This challenges theoretical expectations of a trade-off between ambition and credibility. It illustrates that the policy implementation specificity of NDCs functions as a signal of state capacity and will to the international community. Because of the implementation literature such as this, the selection of explanatory variables in this study includes measures of state capacity, democratic governance, and economic resources. The domestic theories discussed below complement this foundation by identifying the specific mechanisms through which these national characteristics operate.

2.2 Domestic Implementation Theory

Early domestic implementation scholarship was dominated by a top-down perspective that emphasizes central-state authority, policy mandates, and administrative capacity (Birkland, 2019). Scholars of this perspective view implementation as linear, in which a central government develops a policy and implementation is carried out through established bureaucratic procedures (Püzl & Treib, 2007). In order to have a successful implementation, a country must have clear objectives, a legal structure, committed officials, support from interest groups, and stable socioeconomic conditions (Sabatier, 2005). Although these theories highlight the importance of institutional capacity and the resources readily available to fulfill commitments, they have been criticized for assuming linearity and for overlooking how local realities shape policy implementation in practice (Püzl & Treib, 2007). Nevertheless, the top-down perspective

informs this study's inclusion of institutional capacity as a key explanatory variable, and its focus on clear administrative structures motivates the need to examine whether NDCs name specific implementing agencies¹

Cross-national research on climate policy implementation has adopted a similar framing. Dolšak (2009) treats policy implementation as a distinct phase in the policy process, in which institutions are established to shape actor behavior and enable monitoring and sanctioning. She argues this step is particularly challenging when it requires coordination across levels of governance where commitments are negotiated internationally but implemented through national domestic institutions (Dolšak, 2009). This cross-level challenge helps explain why countries that all ratified the same agreement may produce vastly different commitment documents. Although NDCs did not exist in their current form when Dolšak wrote her framework, it maps directly onto the problem this study considers. This study expands her cross-sectional approach to the Paris Agreement era, using NDC language as a measure of domestic institutional framing.

Attempts to bridge top-down and bottom-up approaches led to rational choice theory, which assumes actors have fixed preferences and act accordingly to achieve them (Cerna, 2013). On the implementation side, this framework can uncover the reasons why actors simultaneously implement policy while pursuing their own interests. However, O'Toole (1995) argues that rational choice has limitations for studying implementation, particularly regarding consistency, uncertainty, and lack of institutionalization (O'Toole, 1995). This framework suggests that countries may strategically frame their NDC language, whether to signal institutional readiness and credibility to the international community, or to emphasize support needs in order to mobilize external resources for domestic implementation.

The final relevant domestic theory for this analysis is discursive institutionalism. Schmidt (2008) defines institutional discourse as what policy actors say to one another and to the public when attempting to create and legitimize a policy program (Schmidt, 2008). Unlike traditional

¹ The bottom-up approach examines implementation from the ground up, identifying the networks of actors involved in actual policy delivery (Püzl & Treib, 2007). This perspective argues that policy objectives are negotiated and reshaped during implementation as actors adapt policies to local contexts. Bottom-up scholars emphasize that NGOs, local actors, and the public shape what policies mean in practice and influence policy design through feedback and advocacy. However, bottom-up theories address implementation at the sub-national level and do not pertain to the national-level implementation studied here. This literature is therefore not included in the main review.

institutional theories that focus on formal rules and norms, discursive institutionalism emphasizes the power of language, narratives, and communicative processes in shaping policy outcomes. This theory helps explain why policy may remain unimplemented despite it being in all actors' best interests (Hope & Raudla, 2012). In climate policy, the way a country frames its commitments through pledges, legal terms, and word choices can influence domestic legitimacy, political buy-in, and public support. This theory provides the core justification for treating NDC language as the outcome variable, recognizing that the linguistic choices in these documents reflect and shape political realities.

Taken together, these perspectives explain different aspects of climate policy implementation. International regime theory establishes the crucial dimension of strategic positioning within multilateral frameworks but cannot fully account for domestic variation in how countries respond. Top-down approaches highlight clear objectives and strong institutions but cannot explain why powerful central governments sometimes fail to deliver. Rational choice helps uncover incentives and strategies, but it oversimplifies the role of variability by assuming fixed preferences while overlooking the inconsistency, uncertainty, and lack of institutionalization that shape real-world implementation contexts. Discursive institutionalism emphasizes language and communication but does not fully capture organizational constraints. No single framework is sufficient on its own, which is why this study draws on all four to understand variation in NDC specificity.

2.3 Barriers to Climate Policy Implementation

While theoretical perspectives provide insight into the dynamics of implementation, literature also identifies obstacles that hinder the effective implementation of policies. Understanding these barriers is relevant for this study because they help explain why countries may frame their NDCs in ways that hedge their commitments rather than stating them definitively.

First, political opposition poses a significant barrier to the implementation of national climate policy. Countries with strong industrial opposition and weaker civil society consistently exhibit lower rates of climate policy adoption. This opposition is often economically motivated, as businesses and sectors facing high costs from climate regulation have strong incentives to

organize against it (Hughes & Urpelainen, 2015). Lowi (1964) argues that regulatory policies, those that directly allocate costs and benefits among identifiable groups, create conflict between those who stand to gain and those who will bear the costs. Unlike distributive policies, which can spread benefits widely enough to avoid direct confrontation, regulatory decisions require governments to make clear choices about which groups will be advantaged and which will not (Lowi, 1964). Climate policy is a clear example of this since it imposes real costs on parties such as fossil fuel industries and energy-intensive sectors while distributing benefits broadly across the public. In democratic systems, these dynamic matters because those who expect to bear the costs of climate commitments have the right to organize, lobby, and shape what governments are willing to commit to in writing. Therefore, this means that democracy does not simply strengthen climate commitments, but it also creates openings through which industries or the public can push back against specific, binding policy language.

Empirical support for this idea comes from Dolšák's (2001) cross-national analysis of UNFCCC implementation, which finds that a country's export dependence on fossil fuels is significantly negatively associated with domestic implementation. Countries in which fossil fuels represent a large share of export revenue, such as Nigeria, Kuwait, Saudi Arabia, and Venezuela, showed the weakest domestic policy responses despite having ratified the relevant international agreements (Dolšák, 2001). This pattern emphasizes that the energy composition of a national economy is not simply a technical predictor but a politically consequential one as it shapes the organized interests that governments must manage when drafting climate commitments.

From a discursive perspective, vague or conditional commitment language can itself function as a barrier, reducing accountability and enabling flexible interpretation that enables non-compliance. When countries use conditional language rather than definitive commitments, this may reflect and reinforce limited political buy-in among key stakeholders. These barriers reveal that the conditions shaping NDC language are deeply interconnected with the structural national characteristics examined in this study.

3. Theoretical Framework

The preceding sections identify a range of factors that shape how countries frame their climate commitments. This study draws on three interconnected areas, including political

institutions and capacity, social factors, and economic development, in order to explain cross-national variation in NDC language. Because these areas do not operate alone, the analysis includes all three simultaneously rather than treating any one as sufficient on its own. The following sections develop the theoretical expectations for each area and explain the mechanisms through which they are expected to operate.

3.1 Political Factors

Political institutions shape both the motivation and capacity of governments to develop, communicate, and implement climate policy. Within implementation theory, institutional structures determine administrative capacity, accountability mechanisms, and responsiveness to both domestic and international pressures (Sabatier, 2005; Birkland, 2019). Democratic governments create incentives for political figures to respond to public demands and maintain legitimacy on high-profile issues such as climate change. An example of this comes from Sequeira and Santos (2018), who find that democracy is a statistically significant predictor of renewable energy consumption, suggesting that democratic institutions invest in long-term environmental goals (Sequeira and Santos, 2018). Where public support for climate policy is strong, democratic institutions may amplify that pressure into more ambitious and specific NDC commitments.

At the same time, democracy creates institutional channels through which policy opponents can resist specific, enforceable commitments. In democratic systems, those who expect to bear the costs of climate commitments have the right to organize and shape what their governments are willing to commit to publicly (Lowi, 1964). For example, industries facing high compliance costs may use their political access to push for vaguer, more conditional NDC language that preserves flexibility. This mechanism suggests that greater democracy could be associated with less institutional specificity in NDCs, as governments avoid committing to implementation structures that would constrain future political bargaining. These two ideas generate competing predictions, making it an essential question that this study directly examines.

The second political variable is freedom of expression, which represents a related but distinct dimension of political capacity. While democracy reflects formal institutional structure, freedom of expression captures the ability of individuals, journalists, and civil society to

participate in public discourse and hold governments accountable. Uzar (2024) finds that freedom of expression is positively associated with renewable energy adoption, arguing that open media environments help normalize environmental policy and foster collective awareness of climate risks (Uzar, 2024). Essentially, in countries where civil society can speak openly, NDCs may more accurately reflect domestic vulnerabilities such as adaptation needs that are frequently underrepresented in high-level international negotiations. This suggests freedom of expression may operate differently from formal democratic governance, orienting NDC language toward local concerns rather than international credibility signals.

3.2 Social Factors

The next category of country-specific variables is social capacity, which is the concept that groups are able to work together toward solving a problem and improving collective well-being. Social capacity influences climate policy implementation by shaping public awareness, political pressure, and institutional competence. Policy implementation theory emphasizes that policy outcomes depend not only on formal institutions but also on the social environment in which policies operate (Cerna, 2013). The only social factor included in this study is gender representation since it reflects the inclusiveness and diversity of political decision-making. Climate change disproportionately affects women due to structural inequalities, economic vulnerability, and reliance on climate-sensitive resources, with women constituting approximately 80 percent of those displaced by climate-related events (United Nations, n.d.). Because women are disproportionately affected by climate impacts, greater female political representation may shift policy priorities toward adaptation and the concerns of vulnerable populations. Also, research consistently finds that women in political office tend to express stronger pro-environmental preferences and support more ambitious climate legislation (Mavisakalyan & Tarverdi, 2019), suggesting female representation may also increase the strength and ambition of NDC commitment language. This makes gender representation an essential component to include when examining NDCs ².

² It is important to note that education plays a central role in shaping both individual environmental awareness and institutional capacity. Literature shows that higher levels of education increase public understanding of climate change and strengthen support for environmental protection (Samdahl & Robertson, 1989). At the institutional level, education improves bureaucratic competence and technical capacity, enabling governments to design, implement, and communicate more detailed and credible climate commitments. Additionally, Kolenatý et al. (2022) find that climate change education programs increase students' willingness to engage in pro-climate action, suggesting that

3.3 Economic Factors

Economic capacity shapes both the feasibility of climate policy implementation and the credibility of climate commitments. Implementation theory emphasizes that policy success depends on resource availability, administrative capacity, and technological capability (Sabatier, 2005). In this study, one measure of economic capacity is GDP per capita, which reflects national wealth and overall economic capacity. Wealthier countries possess greater financial resources, technological capacity, and institutional infrastructure for implementing climate policy. These countries also face greater international expectations and reputational incentives to demonstrate climate leadership, which may push their NDCs toward mitigation-oriented, unconditional language. Conversely, less wealthy countries that may face capacity constraints are more likely to frame their commitments as conditional on external support.

Another measure of economic capacity in this study is trade openness, which shows a country's integration within the global economy. Countries deeply embedded in global trade networks face greater exposure to climate-induced disturbances and stronger incentives to align with international climate norms to maintain credibility with trading partners (OECD, 2017). However, high trade exposure may also create incentives for vagueness, meaning that countries facing close scrutiny from trading partners may avoid specific institutional commitments that could be held against them if implementation falls short.

Lastly, two measures of energy system characteristics are used because they shape climate policy capacity in distinct ways. Renewable energy share indicates both technological development and prior political commitment to decarbonization; countries that have already invested in energy transition are more likely to produce credible, specific mitigation commitments (Tompkins & Adger, 2005). On the other hand, fossil fuel energy share measures the proportion of electricity generated from oil, gas, and coal sources. Countries with electricity sectors heavily dependent on fossil fuels face stronger political/ economic pressures from powerful energy interests, which may push governments toward more conditional or hedged climate language. At the same time, these countries face greater international scrutiny to

education can shift both individual attitudes and the broader social environment in which policy is developed. Education was originally included in this study, but the drastically reduced sample size and therefore had to be removed. However, it is important to understand the role it plays in policy implementation.

articulate decarbonization pathways, which could pull NDC language in the opposite direction toward more explicit net-zero commitments.

3.4 Theoretical Integration and Hypotheses

These political, social, and economic factors are interconnected. Despite operating through distinct mechanisms, the resources, institutions, and social capacity that characterize more developed countries systematically shape how those countries communicate their climate commitments. Wealthier, more democratic countries with stronger social institutions face different international incentives, domestic political pressures, and implementation capacities than less developed ones, and those differences should be legible in NDC language. The following hypotheses specify the directional relationships expected for each of the seven language outcome dimensions examined in this study:

H1 – Commitment Language Strength: Countries with higher female political representation will produce NDCs with stronger, more definitive commitment language. Women in political office tend to express stronger pro-environmental preferences and may signal more inclusive governance processes.

H2 – Net-Zero Commitment: Countries with higher fossil fuel energy shares and stronger democratic institutions are more likely to include specific, net-zero targets in their NDCs. Countries with electricity sectors that remain heavily dependent on fossil fuels face greater international pressure to articulate long-term decarbonization pathways, while democratic governance creates public accountability for ambitious climate pledges.

H3 – Implementation Specificity: Less democratic countries will produce NDCs with more specifically named institutions. If democratic institutions are weak or newly established, governments may compensate by explicitly naming ministries and agencies to signal governance capacity to both domestic and international audiences. On the other hand, countries with established democratic institutions may not need to make this explicit because established implementation structures are already established with clear roles.

H4 – Conditional Commitments: Wealthier countries will frame their NDCs with significantly less conditional language. Less wealthy countries often face structural, institutional, and political

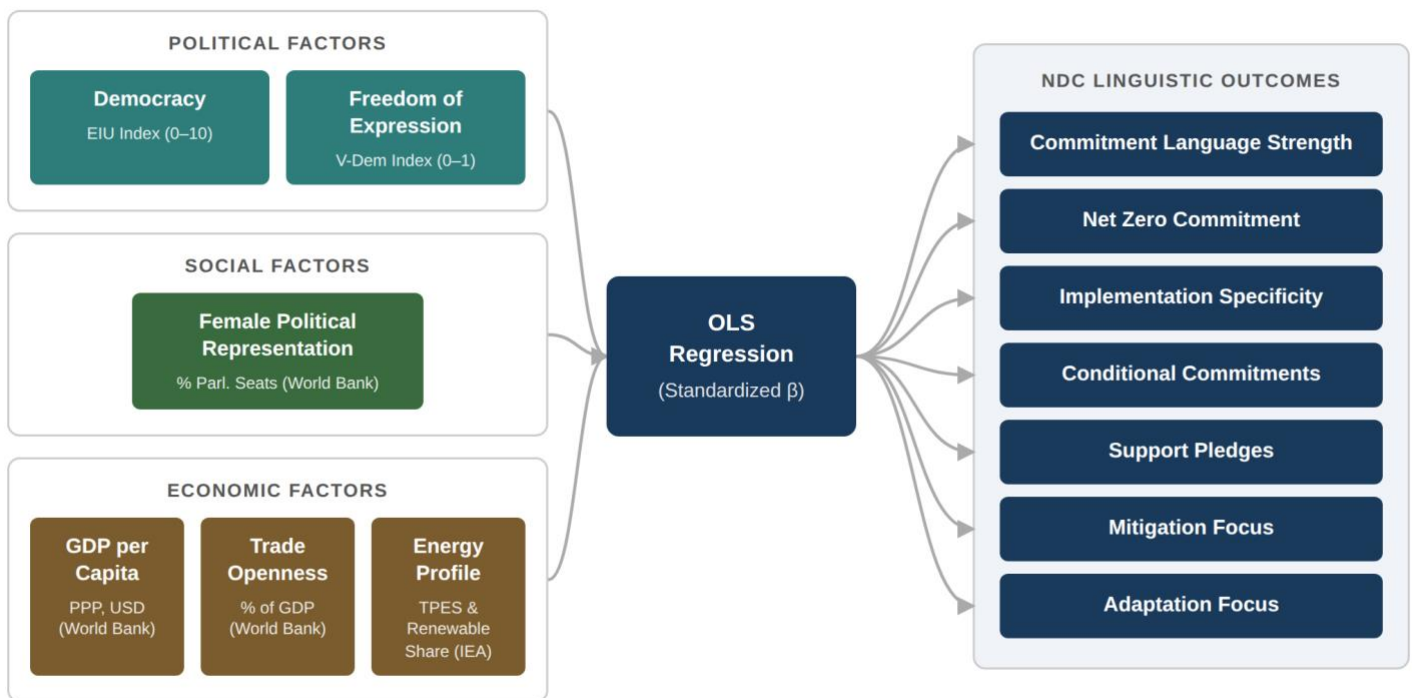
challenges and therefore must frame commitments as contingent on external financial and technical support.

H5 – Support Pledges: More democratic, wealthier countries will use more support pledge language in their NDCs, positioning themselves as providers rather than recipients of international climate assistance. This reflects both the resource capacity to make such pledges, and the expectations that high-income, internationally prominent countries face to demonstrate climate leadership.

H6 – Mitigation Focus: Wealthier, more democratic countries will devote a greater proportion of NDC language to mitigation-related content. A country with greater economic capacity has the ability to absorb the costs of emissions reductions, alongside stronger public and institutional pressure to act on climate change, making mitigation a more politically viable and internationally expected framing for developed countries.

H7 – Adaptation Focus: Less wealthy countries will devote significantly more NDC language to adaptation-related content, primarily using terms of resilience, vulnerability reduction, and disaster management, reflecting both higher climate exposure and fewer resources to pursue mitigation.

Figure 1. Theoretical Framework: National Characteristics and NDC Linguistic Dimensions



Note: All predictor variables from 2019. Outcomes measured via automated text analysis of 93 NDC documents (2020–2023).

Figure 1. Theoretical Framework: National Characteristics and NDC Linguistic Dimensions.

Note: All explanatory variables from 2019. Outcomes measured via automated text analysis of 93 NDC documents (2020–2023).

4. Methods

4.1 Dependent Variables

Seven dependent variables were constructed from automated text analysis of NDC documents:

1. Commitment Language Strength measures the strength of commitment language, operationalized as the proportion of strong commitment terms (e.g., will, commit, ensure) relative to all commitment language, including hedging terms (e.g., may, consider, plan). This yields a continuous score from 0 (exclusively hedging) to 1 (exclusively definitive).
2. Net Zero Commitment score captures whether and how specifically countries commit to long-term decarbonization, using a five-point ordinal scale: 0 = no net zero language; 1 = net zero mentioned without a target year; 2 = net zero with a distant target (2061+); 3 = net zero with a

target year 2051–2060; 4 = net zero with a target year 2050 or earlier. The 2050 and 2060 breakpoints were not set arbitrarily but reflect the actual distribution of target years appearing near net-zero language in the sample. When examining all instances where a year appears within 200 characters of net-zero language across all 93 documents, the mentions cluster sharply around 2050 (261 instances across 37 documents) and 2060 (16 instances across 3 documents), with minimal observations at any other point. The scale therefore follows the data rather than imposing external thresholds, though it is important to note that the 2050 cutoff also corresponds to the IPCC's 1.5°C benchmark and 2060 to the goal adopted by several major economies.

3. Implementation Specificity measures the frequency of named implementing institutions per 1,000 words, including institutions such as ministries, departments, agencies, and other governmental bodies.

4. Conditional Commitments measures the degree to which commitments are framed as conditional on external assistance. Measured per 1,000 words, capturing terms such as "'with support from', 'if supported by', 'upon receipt of', subject to, and 'dependent on.'"

5. Support Pledges measures the frequency of language in which a country positions itself as a provider of international climate assistance, captured per 1,000 words. Terms were selected to reflect donor-side framing, such as "provide support," "provide financing," and "development assistance". This is distinct from recipient-side conditionality language captured in the Conditional Commitments variable. While some terms, such as "contribute to," can appear in both contexts, they are included here because, in combination with the broader donor framing, they skew toward being a provider. This variable and Conditional Commitments are designed as opposites, where a country high on one will typically be low on the other, and the results confirm they are empirically distinct.

6. Mitigation terminology measures the frequency of mitigation-related terms per 1,000 words, including “emissions reduction”, “phase out”, “carbon capture”, etc.

7. Adaptation terminology measures the frequency of adaptation-related terms per 1,000 words, including “resilience”, “vulnerability”, “adaptive capacity”, etc.

4.2 Explanatory variables

While the Paris Agreement's five-year NDC update cycle targeted 2020 as the submission deadline, countries submitted updated NDCs across a staggered timeline from 2020 to 2023, likely due in part to pandemic-related disruptions and capacity constraints. Therefore, the year 2019 was selected as the reference for explanatory variables because it captures national characteristics during the period when most NDCs were being drafted and finalized.

The explanatory variables were measured in the following ways. For Political factors, including democracy and freedom of expression, democracy is measured using the Economist Intelligence Unit Democracy Index, which provides expert estimates of the extent to which citizens can choose political leaders in free and fair elections, enjoy civil liberties, and have a functioning government that acts on their behalf; the index ranges from 0 to 10 (most democratic) (*Democracy Index*, n.d.). Freedom of expression is measured using the V-Dem Freedom of Expression Index, which estimates the extent of free speech and press freedom; it ranges from 0 to 1 (most free) (*Freedom of Expression Index*, n.d.). Moving onto social factors, female political representation is represented by the proportion of seats held by women in national parliaments (*Proportion of Seats Held by Women in National Parliaments (%)*, n.d.). Lastly, economic factors include GDP per capita, trade openness, fossil fuel energy share, and the share of renewable energy. GDP per capita is measured in PPP (current international dollars) (*GDP per Capita, PPP (Current International \$)*, n.d.). Trade openness is measured as trade as a percentage of GDP (*Trade (% of GDP)*, n.d.). Fossil fuel energy share is measured as electricity production from oil, gas, and coal sources as a percentage of total electricity production, drawn from the World Bank World Development Indicators, which cites the IEA Energy Statistics Data Browser as its source (International Energy Agency). Modern renewable energy consumption as a percentage of total final energy consumption is from the International Energy Agency SDG 7.2.1 dataset, which excludes traditional biomass use (*Share of Electricity Production from Renewables*, n.d.). Although education was identified in the theoretical framework as a theoretically relevant social factor, it was not included in the model due to insufficient data availability across the sample of countries with matched NDC documents.

4.3 Statistical Methods

To test these hypotheses, a multiple regression analysis using ordinary least squares (OLS) was used to examine the relationships between continuous national characteristics and NDC linguistic dimensions. The model ($n = 69$) includes the country-specific variables of democracy, freedom of expression, female political representation, GDP per capita (PPP), trade openness, fossil fuel energy share, and renewable energy share entered simultaneously. Within the model, all explanatory variables were standardized (z-scored) prior to estimation. Dependent variables were also standardized to enable comparison of effect sizes across outcomes with different raw scales. This produces standardized regression coefficients (β) that represent the expected change in the outcome (in standard deviation units) associated with a one-standard-deviation increase in the predictor, holding all other predictors constant. Statistical significance was assessed at the $p < .05$ level, with $p < .01$ noted for stronger effects. The 95% confidence intervals for each coefficient are reported alongside point estimates.

4.1 Statistical Methods

To test these hypotheses, a multiple regression analysis using ordinary least squares (OLS) was used to examine the relationships between continuous national characteristics and NDC linguistic dimensions. The model ($n = 69$) includes the country-specific variables of democracy, freedom of expression, female political representation, GDP per capita (PPP), trade openness, fossil fuel energy share, and renewable energy share entered simultaneously. Within the model, all explanatory variables were standardized (z-scored) prior to estimation. Dependent variables were also standardized to enable comparison of effect sizes across outcomes with different raw scales. This produces standardized regression coefficients (β) that represent the expected change in the outcome (in standard deviation units) associated with a one-standard-deviation increase in the predictor, holding all other predictors constant.

Statistical significance was assessed at the $p < .05$ level, with $p < .01$ noted for stronger effects. The 95% confidence intervals for each coefficient are reported alongside point estimates.

4.4 Methodological Limitations

Before moving on to results, it is important to note that this text-based approach captures the linguistic dimensions of NDC documents but does not assess whether targets are legally binding under domestic law, the ambition of targets relative to baseline emissions, implementation progress, or actual emissions outcomes, or whether net-zero commitments have been enacted into legislation. These limitations should be considered when interpreting results.

Table 1. Descriptive Statistics

Variable	N	Mean	SD	Min	Max
Predictor Variables					
Democracy Index (EIU, 0–10)	85	5.346	2.173	1.430	9.870
Freedom of Expression (V-Dem, 0–1)	90	0.6104	0.2888	0.0220	0.9780
Female Political Representation (% seats)	92	24.44	12.50	2.542	61.25
GDP per Capita, PPP (USD)	89	21,269.9	22,984.3	1,056.2	107,503.0
Trade Openness (% of GDP)	83	73.42	42.67	22.82	324.4
Fossil Fuel Electricity Share (% of electricity)	94	56.58	34.73	0.0000	100.0
Modern Renewable Energy Share (% of TFEC)	81	15.58	15.17	0.0000	82.21
Outcome Variables (unstandardized, n = 93 NDC documents)					
Commitment Language Strength (0–1)	93	0.5061	0.1280	0.0000	0.8333
Net Zero Commitment (0–4)	93	1.753	1.909	0.0000	4.000
Implementation Specificity (per 1,000 words)	93	1.640	1.831	0.0000	10.38
Conditional Commitments (per 1,000 words)	93	2.073	1.434	0.0000	6.363
Support Pledges (per 1,000 words)	93	1.339	0.5755	0.0000	3.724
Mitigation Focus (per 1,000 words)	93	20.48	7.400	0.5395	40.47
Adaptation Focus (per 1,000 words)	93	10.03	5.129	0.5724	21.60

Note: Predictor variables are from 2019. Renewable energy share excludes traditional biomass (IEA SDG 7.2.1). Regression models use standardized versions of all variables.

Table 1. Descriptive Statistics. Note: Explanatory variables are from 2019. Renewable energy share excludes traditional biomass (IEA SDG 7.2.1). Regression models use standardized versions of all variables.

5. Results

The OLS regression analysis (n = 69) reveals that national characteristics predict NDC linguistic dimensions in substantively different ways across outcomes. Table 2 and Table 3 present standardized regression coefficients for all seven core outcomes. The strongest model fit emerges for Implementation Specificity and Conditional Commitments, while Support Pledges and Net Zero Commitment show the weakest fit.

Table 2. OLS Regression Results — Primary Model, Part 1 (n = 67)

All predictors entered simultaneously. Outcomes standardized.

Predictor	Commitment Language	Net Zero Commitment	Implementation Specificity	Conditional Commitments
Democracy	+0.030	+0.333	-0.421†	-0.192
Freedom of Expression	+0.262	-0.239	+0.250	+0.218
Female Political Rep.	+0.330*	+0.166	-0.094	-0.107
GDP per Capita (PPP)	-0.049	+0.160	-0.091	-0.447**
Trade Openness	+0.015	+0.044	-0.051	+0.160
Fossil Fuel Elec. Share	+0.233	-0.070	-0.553***	-0.134
Renewable Energy Share	-0.083	-0.099	-0.252†	-0.228
N	69	69	69	69
R²	0.150	0.130	0.379	0.322
Adj. R²	0.053	0.030	0.308	0.244

† p<.10 * p<.05 ** p<.01 *** p<.001 Standardized OLS coefficients (β)

Positive, significant
Negative, significant
Marginal (p<.10)

Table 2. OLS Regression Results — Model, Part 1 (n = 69). Commitment Language, Net Zero Commitment, Implementation Specificity, Conditional Commitments. All predictors entered simultaneously. Outcomes standardized.

Table 3. OLS Regression Results — Primary Model, Part 2 (n = 67)

All predictors entered simultaneously. Outcomes standardized.

Predictor	Support Pledges	Mitigation Focus	Adaptation Focus
Democracy	+0.553†	+0.457	-0.133
Freedom of Expression	-0.232	-0.147	+0.140
Female Political Rep.	+0.006	-0.129	-0.058
GDP per Capita (PPP)	-0.166	+0.061	-0.493**
Trade Openness	-0.034	+0.149	+0.127
Fossil Fuel Elec. Share	+0.158	-0.181	+0.028
Renewable Energy Share	-0.084	-0.159	-0.006
N	69	69	69
R²	0.092	0.151	0.252
Adj. R²	-0.012	0.054	0.166

† p<.10 * p<.05 ** p<.01 *** p<.001 Standardized OLS coefficients (β)

Positive, significant
Negative, significant
Marginal (p<.10)

Table 3. OLS Regression Results — Model, Part 2 (n = 69). Support Pledges, Mitigation Focus, Adaptation Focus. All predictors entered simultaneously. Outcomes standardized

5.1 Commitment Language Strength

After running the regression, female political representation is the only significant predictor of commitment language strength ($\beta = +0.330$, $p < .05$), indicating that countries with higher shares of women in parliament produce NDCs with stronger, more definitive commitment language relative to hedging language. This result holds after controlling for democracy, GDP, and other structural predictors, suggesting that gender representation captures aspects of the NDC drafting process that are not purely reflective of a country's overall level of development. No other predictors reach significance for commitment language therefore, much of the variation in commitment language remains unexplained by structural national characteristics. This may suggest that commitment language reflects diplomatic drafting norms and translation conventions more than underlying national conditions. Two countries (Belarus and India) had commitment term counts below 20, potentially introducing instability in the ratio. However, a sensitivity analysis excluding these countries produced substantively identical results.

5.2 Net Zero Commitment

No predictor reached conventional significance thresholds for net zero commitment. Democracy showed the largest positive association ($\beta = +0.333$) but did not reach significance. Fossil Fuel Energy Share showed a small negative and non-significant association ($\beta = -0.070$), counter to the expectation that countries with more fossil-fuel-dependent electricity sectors would face greater international pressure to commit to specific decarbonization targets. Female political representation also showed a positive but non-significant association ($\beta = +0.166$). The absence of significant predictors for net zero commitment suggests that the decision to include specific long-term decarbonization targets may be driven by factors not captured by the national structural characteristics examined here, such as international negotiation dynamics, technical assistance programs, or individual country leadership rather than systematic national conditions.

5.3 Implementation Specificity

Implementation specificity showed a distinctive pattern driven primarily by energy system characteristics. Fossil Fuel Energy Share was the dominant predictor, showing a strong negative association with named institutional references ($\beta = -0.553$, $p < .001$), indicating that countries with more fossil-fuel-dependent electricity sectors produce significantly fewer explicit institutional references in their NDCs. Renewable Energy Share showed a marginal negative

association in the same direction ($\beta = -0.252$, $p < .10$). Democracy was negatively associated with named institutional references ($\beta = -0.421$, $p < .10$), an effect consistent with the expectation that countries with less established democratic institutions may compensate by naming implementing agencies explicitly to signal governance capacity. GDP per capita was negatively associated ($\beta = -0.091$) but did not reach significance. Thus, the fossil fuel finding is the clearest signal in this model demonstrating that countries with electricity sectors heavily dependent on fossil fuels appear less likely to name specific implementing institutions, possibly because the political sensitivity of energy transition makes detailed institutional commitments strategically costly.

5.4 Conditional Commitments

Conditional commitments showed the clearest pattern from economic predictors. GDP per capita ($\beta = -0.447$, $p < .01$) was the dominant significant predictor, indicating that wealthier countries frame their NDCs with substantially less emphasis on conditional international assistance. Democracy and freedom of expression did not reach significance, though both were directionally consistent with the development divide pattern. Overall, the strength of the GDP effect across this outcome reflects the structural reality that less wealthy countries must frame commitments as contingent on external financial and technical support.

5.5 Support Pledges

No predictor reached conventional significance thresholds for support pledge language at $p < .05$. Democracy showed a marginal positive association which was consistent with the theoretical expectations that more democratic countries would be more inclined to frame themselves as providers of international climate support. The overall weak model fit for this outcome suggests that structural national characteristics explain little of the variation in donor-side framing, which may be shaped more by diplomatic convention or bilateral aid relationships than by the country-level factors examined here.

5.6 Policy Focus: Mitigation

No predictor reached conventional significance thresholds for mitigation-focused language. Democracy showed the largest positive association ($\beta = +0.457$) but did not reach significance. The overall weak model fit for mitigation focus may suggest that the proportion of NDC language devoted to emissions reduction is not strongly shaped by the structural national

characteristics examined here. Mitigation language may be influenced more by country-specific negotiating history, sectoral composition, or template-driven drafting conventions than by the political and economic factors this study examines

5.7 Policy Focus: Adaptation

Adaptation-focused language was strongly predicted by economic development. GDP per capita showed the dominant effect ($\beta = -0.493$, $p < .01$), indicating that wealthier countries devote substantially less language to adaptation. Adaptation framing appears to be primarily an economic phenomenon, which follows the idea that poorer countries, regardless of their political regime type, are more likely to emphasize adaptation needs in their NDC language due to lower capacity to pursue mitigation independently. This is the most consistent finding in the analysis alongside the conditional commitments result, and together they comprise the core idea behind the development divide in NDC language.

6. Discussion

6.1 The Developmental Divide in NDC Language

After reviewing the results, the most consistent pattern in this analysis is the divide between wealthier, more democratic countries and less developed ones in how they linguistically frame their climate commitments. GDP per capita is significantly negatively associated with conditional commitment language ($\beta = -0.447$, $p < .01$), indicating that as national wealth increases, countries are less likely to frame commitments as contingent on external support. This pattern is consistent across multiple predictors and outcome variables, suggesting it reflects a genuine structural feature of international climate governance rather than individual variation in drafting or policy style.

This divide aligns with the logic of international regime theory. Chayes and Chayes (1996) argue that non-compliance and hedged language typically reflect capacity constraints (Chayes, 1996), and the strong negative associations between GDP per capita and both conditional commitments and adaptation focus support this interpretation. Countries with lower GDP are not simply producing weak climate commitments but are also communicating the structural conditions under which their commitments are feasible. Interpreting conditional language and adaptation priorities as insufficient ambition, as some NDC evaluation frameworks

do (Mathur, 2020), risks mistaking structural constraint for political will. The implication for international climate governance is significant: these results demonstrate that climate finance and capacity building are not marginal concerns but necessary preconditions for the kind of unconditional, mitigation-focused language that developed countries use.

This interpretation is reinforced by Dolšak's (2001) incentive-ability framework, which argues that domestic costs of contributing to the international climate public good, both economic and political, are more consequential than a country's capacity to affect aggregate emissions levels. Dolšak finds that international institutions alone cannot explain cross-national variation in commitment levels, and that efforts to address the global climate problem are most productive when focused on reducing the costs of emissions reductions for developing nations rather than increasing transparency or enforcement mechanisms (Dolšak, 2001). The dominance of GDP per capita across multiple outcomes in this study is consistent with the argument that it is not simply that poorer countries lack the institutional will to commit to strong climate pledges, but that the domestic cost makes unconditional, mitigation-first language economically and politically untenable. NDC language in this study reflects the real incentive constraints that national governments face when translating international obligations into domestic policy commitments.

Additionally, Dolšak's (2009) cross-national implementation analysis further sharpens this argument. She finds that governments implement climate commitments not out of global citizenship but because they can justify the costs by pointing to domestic co-benefits, particularly reductions in local pollution. Political actors, she argues, are only willing to bear implementation costs when doing so yields concrete benefits that can be claimed domestically; the promise of contributing to a global public good is, on its own, insufficient motivation (Dolšak, 2009). This logic maps directly onto the development divide in NDC language documented here. Less developed countries, facing higher relative mitigation costs and fewer immediate domestic co-benefits from emissions reductions, are structurally less able to generate the political justification for unconditional, mitigation-first commitments. Their conditional and adaptation-focused NDC language is not a failure of ambition but a rational response to the political and economic constraints their governments face.

6.2 Democracy and Implementation Specificity

The most theoretically notable pattern in the implementation specificity model is the strong negative association between Fossil Fuel Energy Share and named institutional references ($\beta = -0.553$, $p < .001$). Countries with electricity sectors heavily dependent on fossil fuels produce significantly fewer explicit institutional references in their NDCs. One interpretation is that the political sensitivity of energy-sector transition creates incentives to avoid specific institutional commitments that could be held to account by domestic or international audiences. Countries facing strong fossil fuel interests may deliberately produce less institutionally specific climate documents to preserve political flexibility.

Democratic governance also showed a negative association with implementation specificity ($\beta = -0.421$, $p < .10$), though this effect is marginal and should be interpreted cautiously. The direction is consistent with the expectation from discursive institutionalism that countries with established, credible institutional frameworks may not need to explicitly state implementing ministries and agencies in their NDCs since those structures are already stable and legitimate to domestic and international audiences. An NDC from Germany or New Zealand might not name which ministry will lead implementation if those responsibilities are already clearly delegated. By contrast, a country with less established institutions may compensate by naming agencies explicitly to signal the existence of implementation capacity. This interpretation aligns with Victor et al. (2022), who find that institutional quality is the strongest predictor of perceived commitment credibility (Victor et al., 2022). However, given that the democracy effect reaches only marginal significance, this interpretation should be treated as suggestive rather than confirmatory, and replication with a larger sample would be needed to draw firm conclusions.

This finding differs from Dolšak's (2009) result that democracy was positively associated with domestic UNFCCC implementation. The two findings are not necessarily contradictory: Dolšak measured whether countries developed domestic climate institutions at all, while this study measures whether NDCs explicitly name those institutions in their text. A democratic country may have robust, well-established implementing agencies that do not need to be signaled in an NDC precisely because they are already credible and legible to domestic and international audiences. Taken together, the two findings suggest a more nuanced picture where democracy

promotes actual institutional development but may reduce the need for institutional display in policy documents.

6.3 Democracy and Freedom of Expression as Distinct Mechanisms

The results concerning democracy and freedom of expression raise questions about an earlier argument that treated these variables as distinct and opposing mechanisms. In the current model, neither democracy nor freedom of expression is significant for adaptation or conditional commitment outcomes. Democracy shows a marginal negative association with implementation specificity and is directionally consistent with prior expectations for net zero and mitigation though none of these effects reach conventional significance thresholds. Democracy also shows a marginal positive association with support pledges, suggesting a tendency for more democratic countries to position themselves as providers of climate assistance, though this too should be interpreted cautiously. One potential explanation for the broader non-significance of democracy across the model is multicollinearity with GDP per capita, given that wealthier countries tend also to be more democratic. However, the correlation between these two predictors in this sample is moderate ($r = 0.43$), and well below the threshold at which multicollinearity typically inflates standard errors enough to mask genuine effects. Therefore the non-significance of democracy can more likely be attributable to limited statistical power at this sample size or to GDP per capita genuinely capturing the primary driver of variation, rather than to collinearity suppressing an otherwise detectable democracy effect.

Freedom of expression shows uniformly small and non-significant effects across all outcomes. These results caution against reading too much into the distinction between formal democratic institutions and freedom of expression as separate mechanisms shaping NDC language. The stronger and more consistent pattern emerging from this model is that economic development, not regime type, is the primary driver of variation in NDC linguistic framing.

A theoretical explanation for the distinction between formal democratic institutions and freedom of expression remains plausible even if current results do not confirm it. Formal democratic institutions may push NDC language toward internationally recognizable signals such as net-zero targets, unconditional commitments, and a mitigation focus because these are the markers that earn credibility on the global stage. Freedom of expression, by contrast, may

allow domestic voices, including communities most exposed to climate impacts, to influence what ends up in a country's NDC. This aligns with Principle 10 of the Rio Declaration, which holds that public participation and access to information are essential to effective environmental policy (Environment, 2018). Future research with larger samples or more specific measures of civil society participation may be better positioned to test this hypothesis.

6.4 Commitment Language

An unexpected finding in this analysis is that female political representation is the only significant predictor of commitment language strength ($\beta = +0.330$, $p < .05$). Countries with higher shares of women in parliament produce NDCs with a higher ratio of strong, definitive commitment terms relative to hedging language. This result holds after controlling for democracy, GDP, and other predictors, suggesting that gender representation captures aspects of the NDC drafting process that are not reliant on a country's overall level of development. Two theoretical mechanisms may explain this finding. First, is the expectation that women in political office express stronger pro-environmental preferences (Mavisakalyan & Tarverdi, 2019), which may translate into more assertive commitment language. Second, greater female political representation may signal broader, more inclusive governance processes that yield more decisive, less hedged policy documents. The result warrants replication with a larger sample, but it represents a theoretically grounded and novel contribution to the NDC language literature.

All other predictors show consistently weak associations with commitment language strength across all models. Unlike the other dependent variables, the ratio of strong to hedging commitment terms appears to be driven by factors this analysis does not capture. This is most likely diplomatic drafting norms and translation conventions rather than the structural national characteristics examined here. Countries with entirely different political and economic profiles may have used similar commitment language patterns because they relied on the same UNFCCC template, the same international consulting firm, or the same NDC support program. For most countries, commitment language reflects choices made during the drafting process more than underlying national conditions. Examining the role of international technical assistance and secretariat guidance in shaping NDC language would be a productive direction for future research. This finding is worth flagging for researchers who use commitment language as a primary measure of NDC ambition or quality.

6.5 Limitations

This study has several limitations that warrant acknowledgment. First, the analysis captures linguistic dimensions of NDC documents but does not assess implementation outcomes or actual emission trajectories. While legal enforceability language is captured as an exploratory measure, this reflects the frequency of legal terminology in NDC text rather than whether commitments have been formally enacted in domestic law or are legally enforceable. A country may produce an NDC language that is highly specific and institutionally detailed yet fail to implement its commitments, just as a country with vague language may outperform its stated targets. The relationship between NDC language and actual climate performance is an important question that is beyond the scope of this study.

Second, although the model approach controls for each predictor simultaneously, the explanatory variables are correlated across countries. In the presence of multicollinearity, individual coefficients should be interpreted as partial associations rather than causal estimates. Third, the model is based on $n = 69$ countries despite having a larger sample of NDC documents. The smaller sample size reduces statistical power and makes individual coefficients less stable, although it still meets the necessary threshold. Finally, all 93 NDCs in this study were submitted between 2020 and 2023, which means the findings may not reflect patterns across the full set of NDCs countries have submitted since the Paris Agreement was adopted in 2015.

7. Conclusion

This study set out to explain cross-national variation in how countries frame their climate commitments in Nationally Determined Contributions. Using automated text analysis of NDC documents submitted to the UNFCCC between 2020 and 2023, I examined seven linguistic dimensions of policy implementation specificity and tested whether political, social, and economic national characteristics explain that variation. The results reveal a pattern where economic development is the dominant predictor of NDC language, with female political representation and energy system characteristics emerging as secondary but meaningful predictors.

Of the seven hypotheses derived from the theoretical framework, three received full empirical support. As predicted, female political representation was positively associated with

stronger commitment language (H1: $\beta = +0.330$, $p < .05$), while wealthier countries framed their NDCs with significantly less conditional language (H4: $\beta = -0.447$, $p < .01$) and devoted substantially less NDC language to adaptation (H7: $\beta = -0.493$, $p < .01$). H3 received marginal support: democracy showed a negative association with implementation specificity ($\beta = -0.421$, $p < .10$), directionally consistent with the argument that consolidated democratic institutions reduce the need for compensatory signaling in policy documents, though this effect did not reach conventional significance thresholds. H2, H5, and H6 were not supported at conventional significance thresholds. An unexpected finding emerged from the implementation specificity model where fossil fuel energy share was strongly and negatively associated with named institutional references ($\beta = -0.553$, $p < .001$), suggesting that countries with electricity sectors heavily dependent on fossil fuels produce less institutionally specific NDC language, possibly because energy-sector commitments carry greater domestic political costs.

The most theoretically significant contribution of this study is the strong negative relationship between fossil fuel energy share and implementation specificity. Countries with more fossil-fuel-dependent electricity sectors produce significantly fewer named institutional references in their NDCs, which reframes implementation specificity as a politically contingent communicative strategy rather than a straightforward indicator of governance capacity. The sensitivity of energy transition commitments to domestic political opposition appears to suppress the very institutional detail that NDC evaluation frameworks treat as a signal of implementation readiness. Democracy showed a marginal negative association with implementation specificity in the same direction ($\beta = -0.421$, $p < .10$), consistent with the argument that established democracies may not need to explicitly signal governance capacity in their NDCs because their institutional structures are already credible to domestic and international audiences. Taken together, these findings suggest that high institutional specificity in NDC language may paradoxically be most common where implementation is least certain, and least common where powerful energy interests constrain what governments are willing to commit to in writing.

The developmental divide documented across multiple dependent variables has direct implications for international climate governance. If less developed countries frame their commitments as conditional and adaptation-focused because of genuine structural constraints rather than insufficient ambition, then holding those countries to the same standards of

unconditional, mitigation-first language as wealthy nations misrepresents the political and economic realities they face. The strength of GDP per capita as a predictor of both conditional commitments ($\beta = -0.447$, $p < .01$) and adaptation focus ($\beta = -0.493$, $p < .01$) demonstrates that this divide is not incidental but structurally embedded in the international climate system. Climate finance and capacity building are not peripheral concerns in this framework but necessary preconditions for the kind of language that NDC evaluation systems tend to reward. The ambition gap cannot be closed by expecting developing nations to adopt the rhetorical conventions of countries with fundamentally different resources.

Several directions for future research follow from these findings. First, this study analyzes NDC language but does not assess implementation outcomes or actual emissions trajectories. Connecting linguistic dimensions of NDCs to subsequent policy action and emissions data would substantially strengthen the causal interpretation of these results. Second, the sample of 69 countries in the model limits statistical power; expanding the dataset to include more complete national predictor coverage would enable more robust testing of the hypotheses examined here. Third, no predictor reached significance for net zero commitment, which represents an important gap. The absence of structural predictors for long-term decarbonization pledges suggests that factors beyond national characteristics such as international negotiating dynamics, UNFCCC secretariat guidance, or bilateral diplomatic pressure may drive whether countries include specific net zero targets. Future research examining these external influences would complement the structural approach taken here. Finally, the consistently weak explanatory power for support pledges suggests that donor-side framing may be shaped more by diplomatic convention and bilateral aid relationships than by the country-level factors this study examines.

The Paris Agreement was designed to get as many countries as possible to the table by letting them set their own targets. This study suggests that the language countries use to frame those commitments is not arbitrary but reflects the structural conditions under which governments translate international obligations into domestic policy. Understanding that variation is a necessary step toward designing more effective international climate governance arrangements that account for the real constraints developing nations face, rather than evaluating all countries against a standard built from the experience of the wealthiest ones.

Bibliography

- Birkland, T. (2019). *An Introduction to the Policy Process: Theories, Concepts, and Models of Public Policy Making*.
https://www.researchgate.net/publication/334347787_An_Introduction_to_the_Policy_Process_Theories_Concepts_and_Models_of_Public_Policy_Making
- Chayes, A., & Chayes, A. H. (1996). *The New Sovereignty: Compliance with International Regulatory Agreements*. Harvard University Press.
<http://ebookcentral.proquest.com/lib/washington/detail.action?docID=3300758>
- Democracy Index. (n.d.). Our World in Data. Retrieved April 29, 2026, from
<https://ourworldindata.org/grapher/democracy-index-eiu>
- Dolšák, N. (2001). Mitigating Global Climate Change: Why Are Some Countries More Committed Than Others? *Policy Studies Journal*, 29(3), 414–436.
<https://doi.org/10.1111/j.1541-0072.2001.tb02102.x>
- Dolšák, N. (2009). *Climate Change Policy Implementation: A Cross-Sectional Analysis*.
<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1541-1338.2009.00405.x>
- Freedom of Expression Index. (n.d.). Our World in Data. Retrieved April 29, 2026, from
<https://ourworldindata.org/grapher/freedom-of-expression-index>
- GDP per Capita, PPP (current international \$). (n.d.). [Dataset]. The World Bank. Retrieved
<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?view=map&year=2019>
- Hope, M., & Raudla, R. (2012). Discursive institutionalism and policy stasis in simple and compound polities: The cases of Estonian fiscal policy and United States climate change policy. *Policy Studies*, 33(5), 399–418. <https://doi.org/10.1080/01442872.2012.722286>
- Hughes, L., & Urpelainen, J. (2015). Interests, institutions, and climate policy: Explaining the choice of policy instruments for the energy sector. *Environmental Science & Policy*, 54, 52–63. <https://doi.org/10.1016/j.envsci.2015.06.014>
- International trade consequences of climate change (OECD Trade and Environment Working Papers No. 2017/01; OECD Trade and Environment Working Papers, Vol. 2017/01). (2017). <https://doi.org/10.1787/9f446180-en>
- Kolenatý, M., Kroufek, R., & Činčera, J. (2022). What Triggers Climate Action: The Impact of a Climate Change Education Program on Students' Climate Literacy and Their Willingness to Act. *Sustainability*, 14(16), 10365. <https://doi.org/10.3390/su141610365>

- Laurence, J. O. (1995). *Rational Choice and Policy Implementation: Implications for Interorganizational Network Management*. <https://doi.org/10.1177/027507409502500103>
- Lowi, T. J. (1964). American Business, Public Policy, Case-Studies, and Political Theory Business, Public Policy, Case- Studies, and Political Theory. *World Politics*, 16(4), 677–715.
- Mathur, R. (2020). Taking stock of national climate policies to evaluate implementation of the Paris Agreement. *Nature Communications*. <https://doi.org/10.1038/S41467-020-15414-6>
- Overview – SDG7: Data and Projections – Analysis. (n.d.). IEA. Retrieved April 29, 2026, from <https://www.iea.org/reports/sdg7-data-and-projections/overview>
- Proportion of seats held by women in national parliaments (%). (n.d.). World Bank Gender Data Portal. Retrieved April 29, 2026, from <https://genderdata.worldbank.org/en/indicator/sg-gen-parl-zs>
- Pülzl, H., & Treib, O. (n.d.). Implementing Public Policy. In *Implementing Public Policy: Governance in Theory and in Practice*.
- Rogelj, J., den Elzen, M., Höhne, N., Fransen, T., Fekete, H., Winkler, H., Schaeffer, R., Sha, F., Riahi, K., & Meinshausen, M. (2016). Paris Agreement climate proposals need a boost to keep warming well below 2 °C. *Nature*, 534(7609), 631–639. <https://doi.org/10.1038/nature18307>
- Sabatier, P. A., & Mazmanian, D. (2005). *The Implementation of Public Policy: A Framework of Analysis* | Request PDF. <https://doi.org/10.1111/j.1541-0072.1980.tb01266.x>
- Schmidt, V. (2008). Discursive Institutionalism: The Explanatory Power of Ideas and Discourse. *Annual Review of Political Science*, 11. <https://doi.org/10.1146/annurev.polisci.11.060606.135342>
- Sequeira, T. N., & Santos, M. S. (2018). Renewable energy and politics: A systematic review and new evidence. *Journal of Cleaner Production*, 192, 553–568. <https://doi.org/10.1016/j.jclepro.2018.04.190>
- Share of electricity production from renewables. (n.d.). Our World in Data. Retrieved April 29, 2026, from <https://ourworldindata.org/grapher/share-electricity-renewables?tab=line&country=&overlay=download-vis>

- Tompkins, E. L., & Neil Adger, W. (2005). Defining response capacity to enhance climate change policy. *Environmental Science & Policy, Mitigation and Adaptation Strategies for Climate Change*, 8(6), 562–571. <https://doi.org/10.1016/j.envsci.2005.06.012>
- Trade (% of GDP). (n.d.). World Bank Open Data. Retrieved April 29, 2026, from <https://data.worldbank.org>
- Uzar, U. (2024). Free Speech, Green Power: The Impact of Freedom of Expression on Renewable Energy. *Sustainability*, 16(19), 8723. <https://doi.org/10.3390/su16198723>
- Victor, D. G., Lumkowsky, M., & Dannenberg, A. (2022). Determining the credibility of commitments in international climate policy. *Nature Climate Change*, 12(9), 793–800. <https://doi.org/10.1038/s41558-022-01454-x>