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Does the political affiliation of a city's leadership predict the stringency of its environmental regulations?

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ABSTRACT

Cities across America have vastly different protocols and regulations about the environment, yet the reasons for the differences are not understood. While federal and state governments set broad environmental frameworks, in the end it is ultimately municipal leaders who make the legislative decisions that affect the residents in those cities. This study examined whether the political affiliation of a city's municipal leadership serves as a statistically significant predictor of local environmental policy stringency across 30 United States cities. A self developed instrument, City Environmental Stringency Index (CESI), was used to score each city across four policy domains: Renewable energy, Waste Management, Emissions Reduction, and Climate Adaption. Each domain was then scored on a scale of 0.0 to 2.5 yielding a composite score of all domains to be from 0.0 to 10.0. Scores for each domain were calculated from a defined scoring index. Cities were classified into three political categories (Democratic, Neutral, Republican) based on indicators of political alignment such as presidential election county data and mayoral party affiliation. It was concluded that political affiliation is a statistically significant predictor of environmental stringency.

INTRODUCTION

Cities have become central hubs in addressing environmental issues, from renewable energy to air and water quality regulation. While federal and state governments set broad environmental frameworks, city governments determine the daily rules that impact residents directly. These decisions at the local level produce tangible outcomes in environmental policies (City Rules, 2025). A clear example of this is visible even across neighboring cities, two municipalities in the same state can have dramatically different building codes, zoning ordinances, and sustainability mandates simply because their local governments have chosen different legislative priorities. One city may require all standards to be met for development while a neighboring city imposes no requirement only requiring minimum standards. These gaps are not accidental. They reflect deliberate policy choices made at the municipal level, and have a large impact on the residents within the municipalities.

There are many examples of the power of local environmental policy around the world. A notable one was San Francisco's ban on plastic bags and its measurable impact on the environment. The act led to a

76% reduction in creek and river litter, and a 59% drop in park and roadside plastic bag litter, along with a 69% reduction in plastic bag litter in storm drains ("The Problem of Plastic Bags"). This single municipal ordinance which is not a federal or state law produced quantifiable environmental improvement. It demonstrates that local governments can meaningfully address environmental issues.

However, the success of policies like this also raises a broader question of why do some cities adopt stronger environmental regulations than others? Understanding these differences has become increasingly important for both policymakers and residents, and because each city operates under unique conditions, political affiliation may be a key factor influencing these variations.

The current contrasting ideologies at the federal level are well established and understood, that Democratic leadership in the United States is connected with strong commitments to climate action, renewable energy expansion, and stricter environmental regulation, while Republican leadership generally prioritizes economic growth, deregulation, and flexible standards over strict constraints(Engel et al., 1996). These ideological differences shape not only how elected officials talk about the environment, but also what ordinances they actually pass and enforce. These patterns are well established at the federal level, where partisan divides on environmental policy are extensively documented. However, urban governance is far more complex than the policies that exist at the federal level. Cities are often defined by their geographical features, the economy of the city, and the resources that exist within those cities. Consequently, a study of municipal environmental policy requires an examination of various policy domains simultaneously, rather than reviewing the policies within a single domain. Furthermore, most previous research into environmental policy has examined either the federal or state government, and has instead reviewed the ideological differences regarding the policies within those levels of government. However, there is limited research regarding how the municipalities of the country relate to such policies, and how different ideologies may impact the implementation of those policies at the local level. Thus, there is a need to address the gap in the research on municipal governments and policies, leading to the question: Does the political affiliation of a city's leadership indicate the stringency of its environmental policies? It was hypothesized that political affiliation would serve as a statistically significant predictor of municipal environmental policy stringency. Specifically, it was predicted that Democratic led cities would have consistently higher CESI scores across all four policy domains than Neutral and Republican led cities, reflecting the ideals at the national level.

LITERATURE REVIEW

The relationship between political party affiliation and environmental policy is very divided in American politics. According to survey data from Pew Research center it consistently shows that Democratic voters are way more likely than Republican voters to prioritize environmental protection (Kennedy & Tyson, 2024). These differences transfer to the state level as well; research has similarly found that states with a Democratic majority are more likely to have policies which help protect the environment than states with a Republican majority (Engel et al., 1996). States with Democratic leaders tend to produce more

comprehensive climate action plans, while states which are primarily Republican push for increased deregulation measures.

At the municipal level, where this study is focused the relationship between politics and environmental policy becomes increasingly more nuanced. Similarly Gurney et al (2022) analyzed climate adaptation policies across 88 US cities and found that while Democratic led cities generally adopted stronger environmental measures external factors such as extreme weather could push even Republican led cities toward more aggressive action. This shows that while political ideology is important, it is not the only force shaping environmental policy and that local conditions play a significant role. Another important idea in this research is the difference between classifying symbolic and actual environmental policy. Opposition to environmental regulation does not always mean completely rejecting it. Instead it comes in other ways like weakening enforcement, cutting funding, or delaying when policies are put into action. This means that just because a policy exists does not necessarily mean it is effective, rather it is important to see how enforceable these policies really are.

Measuring environmental policy strength at the city level is difficult. Past studies have used different methods, such as city surveys, participation in climate coalitions, or looking at individual policies. However, each one has some limitations. Survey data can be biased since cities may present themselves better than what is actually true and focusing on one area does not capture the full scope of environmental governance. Building a strong index requires clear scoring criteria, the use of reliable evidence, and consistency across evaluations (Crossman, n.d.).

Overall, existing research strongly shows that political affiliation influences environmental policy, especially at the national and state levels, and that stronger regulations can lead to real environmental outcomes. However, the gap focuses on the local levels of government, in understanding how these patterns play out at the city level, where policies like building codes and regulations are actually put into practice. The study aims to address that gap by examining how political affiliation affects the strength of environmental regulations at the municipal level.

METHODOLOGY

To assess how the political affiliation of municipal leadership predicts the stringency of local environmental policies was done by creating a sample group where 30 U.S. cities were chosen based on population size, geographic diversity, and political leadership. Cities were selected to create three equal political groups of ten cities each while maintaining geographic diversity and including major municipalities of comparable public visibility, and selection was also influenced by the availability of publicly accessible data from each municipality.

To ensure a balanced comparison, Ten Republican cities, ten Democratic cities, and ten non-partisan cities were selected. The political affiliation of each city was determined by identifying mayors and their registered parties in addition to the county level voting data from the 2024 presidential election. Cities were classified as Neutral when mayoral offices were officially nonpartisan or when mayoral affiliation and county-level voting data did not clearly align with one political party.

The stringency of each city's environmental laws was then measured using a City Environmental Stringency Index (CESI), which finds the average score from four integral policy domains regarding the environment. The domains include Renewable energy, Waste management, Emissions reduction, and climate adaptation. Each domain was scored on a scale of 0.0 to 2.5 with a score of 2.5 indicating stricter laws regarding the domain and a score of 0.0 representing more lenient laws regarding the domain. The total score for all the domains is from 0-10, this design not only compares how political ideology predicts overall policy strength but also tested to see if specific domains such as waste management were more politically neutral than others. The CESI rubric was developed by identifying common forms of municipal environmental regulation across academic literature and official city policy documents.

To gather the specific policy data used in the CESI scoring process explained above, municipal codes and sustainability plans of all 30 cities were analyzed using a standardized legislative scraping. Specifically only official government websites and legal databases were used to ensure correct policy interpretation and correct scoring of each city. To ensure accuracy, scores were also assigned based purely off of the nature of the policies found. This search process and scoring criteria was applied in the same nature to every city in the sample to prevent researcher bias as seen in appendix 1.

Domain	**Score**	**Level**	**Qualifying Evidence**
Domain Renewable Energy	0.0	*Null*	No renewable energy targets in the City General Plan, Strategic Plan, or Municipal Code.
	0.5	*Symbolic*	Aspirational resolutions passed but no binding legislation or dedicated funding.
	1.0	*Pilot / Voluntary*	Small-scale pilot programs or voluntary resident engagement programs
	1.5	*Incentive-Based*	Financial levers without mandates: tax abatements, rebates, fee waivers, or expedited solar permitting.
	2.0	*Municipal Mandate*	Binding ordinance requiring a set percent of renewable energy for municipal operations.
	2.5	*Systemic Mandate*	Community-wide binding ordinance: CCA with green default
Domain Waste Management	0.0	*Null*	Basic collection only; no diversion targets or programs.
	0.5	*Educational*	Public awareness campaigns with no regulatory backing.
	1.0	*Voluntary*	Optional recycling services or voluntary Green Business challenges.

Domain	Score	Level	Qualifying Evidence
	1.5	*Partial Regulation*	Mandatory residential recycling without enforcement; soft restrictions
	2.0	*Strict Regulation*	Binding ordinances banning specific materials with civil penalties or mandatory commercial recycling.
	2.5	*Zero Waste*	Comprehensive Zero Waste ordinances: mandatory organics diversion
Domain Emissions Reduction	0.0	*Null*	No GHG inventory conducted within the last 5 years.
	0.5	*Inventory Only*	One-time GHG inventory or Climate Emergency Declaration with no follow-on policy.
	1.0	*Planning*	Formal Climate Action Plan with long-term targets but no immediate binding legislation.
	1.5	*Reporting*	Energy Benchmarking Ordinance requiring large buildings to disclose usage
	2.0	*Performance*	Building Performance Standards requiring energy targets with fines for non-compliance.
	2.5	*Net Zero*	Binding all-electric or net-zero standards for new construction; fossil fuel hookups banned.
Domain Climate Adaptation	0.0	*Null*	No mention of climate risks in the City Master Plan.
	0.5	*Acknowledgement*	General text acknowledgement of climate risks without spatial analysis.
	1.0	*Assessment*	Formal Climate Vulnerability Assessment (CVA) identifying at-risk assets or populations.
	1.5	*Guidance*	Non-binding Resilience Design Guidelines for developers
	2.0	*Zoning Overlay*	Binding zoning amendments restricting development in high-risk zones
	2.5	*Infrastructure*	Dedicated legally earmarked funding mechanism: resilience bond, stormwater tax, or green infrastructure fee.

Appendix 1. City Environmental Stringency Index (CESI) — Full Scoring Rubric

The four policy domains (Renewable energy, Waste, Emissions, Adaption) were chosen for this study not only because they represent the largest sectors of urban greenhouse gas emissions, but also

because they are the areas most frequently relegated at the local level rather than controlled by the federal government (Lazarus & Zdeb, 2021). Additionally, analyzing lasting ordinances rather than just plans accurately showcases the difference between symbolic political speech and true legal enforcement.

DATA ANALYSIS

Initial examination of the raw CESI scores reveals a clear pattern across all three political groups. Democratic led cities clustered near the top of the scoring range, with scores spanning from 6.5 (Atlanta) to 9.5 (Seattle and San Francisco). Neutral cities occupied a middle range, with scores between 3.0 and 6.0. Republican led cities generally scored in the lower portion of the range, with most falling between 1.0 and 4.0. The one notable exception within the Republican group was Miami, FL, which scored 6.5 which was a result that can be considered as an outlier from the average of the Republican scores. These patterns suggested the presence of a relationship between political affiliation and environmental stringency before any statistical analysis. To further visualize these differences, Figure 1 displays the mean CESI score for each political group.

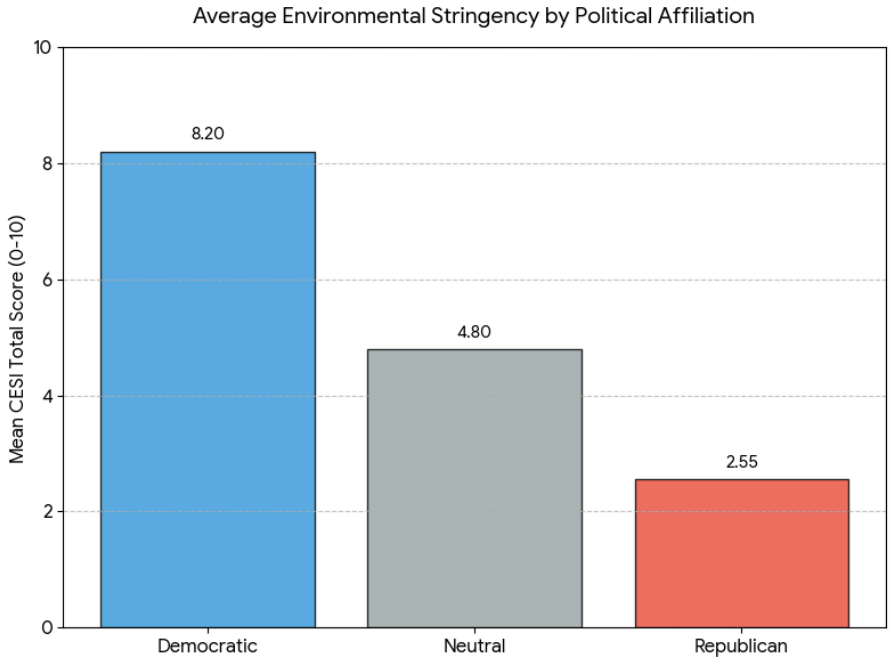

Figure 1. Bar Graph of Mean CESI Scores by Political Group

As shown in Figure 1, Democratic cities have a significantly higher average CESI score than both Neutral and Republican cities, reinforcing the observed trend in the raw data. The descriptive statistics presented in Table 2 confirm the pattern observed in the raw scores.

Political Group	N	Mean CESI Score	Std. Deviation	Minimum	Maximum
Democratic	10	7.92	0.98	6.5	9.5
Neutral	10	5.00	0.89	3.0	6.0
Republican	10	2.40	1.55	1.0	6.5

Table 2. Descriptive Statistics for CESI Scores by Political Affiliation

The descriptive statistics presented in Table 2 confirm the pattern observed in the raw scores. Democratic cities achieved a mean CESI score of 7.92 out of 10.0, with a relatively low standard deviation of 0.98, indicating that high environmental stringency was consistent across the group rather than driven by a single outlier. Neutral cities averaged 5.00, placing at the midpoint of the scoring scale, with a similarly tight standard deviation of 0.89. Republican cities averaged 2.40, with a higher standard deviation of 1.55, showing Miami as an outlier pulling the group mean upward. The separation between group means suggested that political group membership accounted for a substantial portion of the variation in CESI scores. To better illustrate the variability within each political group, Figure 2 presents a box plot of CESI score distributions.

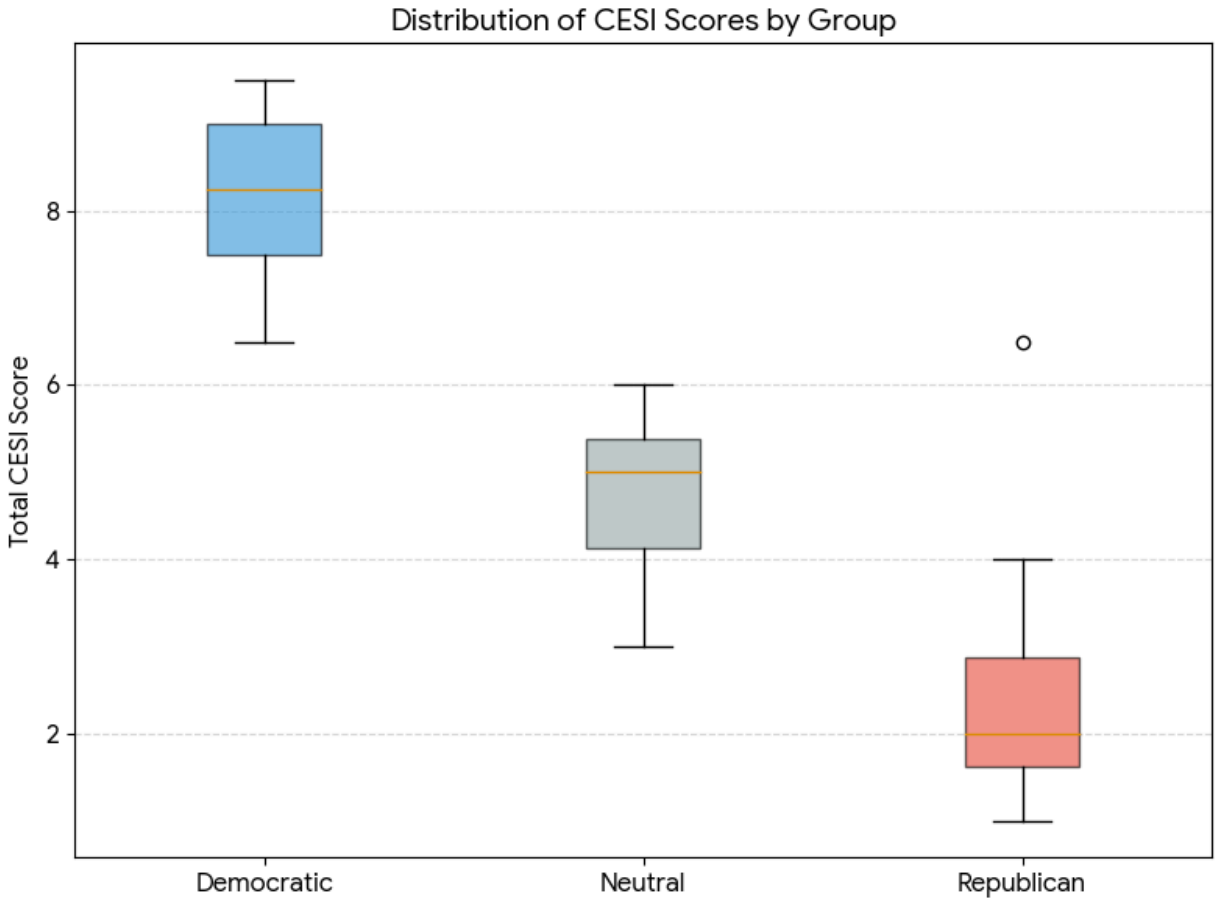

Figure 2. Distribution of CESI scores across political groups, highlighting variability and outliers such as Miami, FL.

Figure 2 demonstrates that Democratic cities not only score higher on average, but also exhibit relatively low variability. In contrast, Republican cities show greater spread, largely due to the presence of Miami as a high scoring outlier. And to determine whether these differences were statistically significant rather than a product of sampling variability, a one way Analysis of Variance (ANOVA) was conducted. A one-way Analysis of Variance (ANOVA) was conducted to compare mean CESI scores across the three political groups. This test was selected to determine whether differences between group means were statistically significant.

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	143.22	2	71.61	50.89	< .001
Within Groups	38.01	27	1.41	—	—
Total	181.23	29	—	—	—

Table 3. One Way ANOVA Summary Table for CESI Scores by Political Group

The one way ANOVA results presented in Table 3 confirm that the differences in mean CESI scores across the three political groups are statistically significant. The p-value of less than .001 means that there is less than a 0.1% probability that differences of this magnitude would occur by chance if political affiliation had no true relationship with environmental stringency. These results provide strong statistical evidence to reject the null hypothesis and conclude that political affiliation is a significant predictor of municipal environmental policy stringency, as measured by the CESI.

DISCUSSION AND IMPLICATIONS

This study's findings have broad implications for residents as well as policymakers and researchers involved with urban environmental governance. More specifically, the findings illustrate the degree to which a city's environmental outcomes are significantly influenced by who controls political power at the level of municipal government. For policymakers, these findings underscore the importance of local elections as a determinant of environmental outcomes. The partisan divide that is well documented at the federal level is not simply a product of national politics; it is replicated at the municipal scale in ways that directly affect residents daily lives.

The development and application of the CESI also carries methodological implications for future research. By operationalizing environmental stringency across four domains using a standardized, evidence based scoring rubric applied exclusively to binding ordinances rather than aspirational plans, this study provides a replicable framework for comparing municipal environmental governance. The distinction the CESI draws between symbolic policy statements and enforceable legal mechanisms addresses a gap in prior research that has often conflated these two categories, and the composite scoring approach captures the multidimensional nature of urban environmental governance more comprehensively than single domain analyses.

LIMITATIONS

Several limitations of this study warrant acknowledgment. First, the sample size of 30 cities, while balanced across political groups, is relatively small and may not fully represent the diversity of American

municipal governance. There are over 19,000 incorporated municipalities in the United States (*City / Town Hall*, 2024), and the cities selected for this study skew toward larger, more prominent urban centers. Which do not reflect the smaller municipalities that also exist within the United States.

Second, the CESI is a researcher developed instrument that has not yet undergone external validation. While scores were assigned using transparent, predefined criteria based entirely on official government documents, and a subset of scores was verified through independent review, the scoring of each domain could contain bias in the scoring of the domains for each city.

Third, the classification of cities as Neutral has some ambiguity. A city classified as Neutral based on mayoral party affiliation and county level presidential voting data may still have some preference of political ideology within the local government.

Fourth, this study examines only four policy domains, which, while chosen for their breadth and local controllability, do not encompass the full scope of municipal environmental governance. Areas such as transportation policy, urban tree canopy ordinances, environmental justice provisions, and water quality regulation represent additional dimensions of local environmental action that were outside the scope of this study due to how not all domains are prevalent in all municipalities in the United States.

FUTURE DIRECTIONS

While this study examines political affiliation as a predictor, additional factors such as population size, median income, state policy context, climate-risk exposure, and municipal budget capacity may also influence outcomes. Future research should address the limitations of this study in several ways. Expanding the sample to include 100 or more cities across a wider range of population sizes and geographic contexts would substantially improve the generalization of the findings and allow for more statistical modeling and a more accurate grading. In addition, external validation of the CESI scoring rubric by independent experts in environmental policy and municipal governance would strengthen the instrument's credibility and facilitate its use in future comparative research. Such a study would directly address the limitations of the current cross sectional design and would represent a significant contribution to the growing literature on urban environmental politics.

CONCLUSION

The findings of this study directly support the original hypothesis that political affiliation serves as a statistically significant predictor of municipal environmental policy stringency. Democratic led cities demonstrated consistently higher CESI scores across all four policy domains, with a group mean of 7.92 out of 10.0, compared to 5.00 for Neutral cities and 2.40 for Republican led cities. The one way ANOVA confirmed that these group differences were statistically significant ($p < .001$), indicating that the variation in environmental stringency between political groups is highly unlikely to be the result of

chance or sampling error. These results extend the well documented partisan divide on environmental policy at the national and state levels into the municipal level, where day to day policy implementation and enforcement directly affects residents.

This can be seen through Miami, FL which is a Republican controlled municipality and received a CESI score of 6.5 which is significantly higher than the average Republican group CESI of 2.4, and nearly equal to Democratic cities with the lowest CESI scores. The outlier is consistent with the findings of Gurney et al. which indicate that geographic exposure to climate risk can lead municipalities to pursue more environmental policies independent of the party in power (Gurney et al., 2022). Miami is geographically vulnerable to sea level rise, flooding, and hurricane impacts (Sea Level Rise and Flooding, 2021); it is a unique example of where local conditions result in pressure to implement environmentally focused policies that cross party lines. Instead of weakening the results of the overall study, it shows that while political affiliation is a strong and statistically significant predictor of environmental stringency, political affiliation is also not the only variable which can affect stringency of environmental policy.

Democratic led cities consistently performed better than their Neutral and Republican led counterparts in all four CESI domains (renewable energy, waste management, emissions reduction, and climate adaptation). In particular, this is consistent with earlier research which has shown that Democratic leadership results in more robust commitments on the federal and state levels to climate action as well as regulatory enforcement (Kennedy & Tyson, 2024), and confirms that this finding may be generalized to municipal government as well.

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