Dear Review Committee,

I am writing to express my strong interest in participating in the NBER PhD Student Workshop on Climate Finance. I am currently a third-year PhD candidate in Accounting at the University of Oregon, and I expect to complete my degree by June 2027. Professor Laura Wellman, who has closely supervised my work, would be happy to provide a reference and can be reached at wellman@uoregon.edu.

My research lies at the intersection of environmental policy, political economy, and supply chains. Broadly, I am interested in how firms and investors respond to climate-related regulations and geopolitical uncertainty through financial disclosures, capital allocation, and operational strategies. My first working paper, *"State-Level Environmental Policy Uncertainty and Green Investing and Operating Decisions"* (co-authored with Scott Robinson, Beverly Walther, and Laura Wellman), examines how utility firms adjust both existing and future capital investments as well as day-to-day operations in response to varying levels of state environmental policy uncertainty. The setting allows for granular measurement of green investment and operational decisions.

In another stream of research, I collaborate with Chengzhu Sun and Weikai Li to investigate the effects of the EU Carbon Border Adjustment Mechanism (CBAM) on carbon leakage and the competitive balance between EU and non-EU suppliers. We explore how cross-border carbon taxation may reshape global supply chains.

Looking ahead, I intend to further develop my dissertation in climate finance by examining how firms strategically manage and disclose their carbon emissions in response to the CBAM. I plan to analyze whether non-EU suppliers to EU CBAM-covered importers increase disclosure of Scope 1 and 2 emissions while reducing disclosure of Scope 3 emissions, as carbon leakage potentially shifts upstream in the supply chain.

I would be deeply grateful for the opportunity to receive feedback from leading scholars and peers at the Climate Finance Workshop. I am particularly excited by the chance to engage with ongoing work on how climate policy interacts with financial markets and firm behavior, and I believe this workshop will play a critical role in sharpening the focus and impact of my dissertation.

Thank you very much for considering my application. I look forward to the opportunity to participate in this important academic gathering.

Sincerely,

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EDUCATION

University of Oregon — Oregon, US
Ph.D. in Accounting — *Aug 2023-Present*

The Hong Kong University of Science and Technology — Hong Kong
Research Assistant — *Jun 2021 - Aug 2023*
Supervisor: Prof. Kevin C. W. CHEN and Prof. Chengzhu SUN

Master of Science in Accounting (Accounting Analytics Concentration) — *Aug 2020 - Jun 2021*

The Hong Kong Polytechnic University — Hong Kong
Bachelor of Business Administration (Hons) in Accounting and Finance — *Sep 2016 - Jun 2020*

CERTIFICATES & QUALIFICATIONS

2021 Legal Professional Qualification Certificate, by Ministry of Justice, P.R.C.
2021 Securities Qualification Certificate of China, by Security Association of China
2020 CFA Level I Passed

RESEARCH

Working Paper

1. **"State-Level Environmental Policy Uncertainty and Green Investing and Operating Decisions"** with Scott Robinson, Beverly Walther and Laura Wellman
   - **Present at: 2024 UBCOW (Robinson)**

"This paper investigates the effect of state-level environmental policy uncertainty on green investment and operational decisions. We focus on the electric utility industry because we can obtain detailed measures of investment, thereby allowing us to examine decisions regarding assets-in-place and new investments separately, as well as previously unexamined operating decisions. First, we document that high state-level environmental policy uncertainty is, on average, associated with a reduced likelihood of investments in new green plants. Next, we examine whether this association varies for firms operating in states with existing pro-environmental policies (i.e., mandatory renewable portfolio standards). For firms operating in states with mandatory standards, we find that high policy uncertainty does not affect the level of new green plants, suggesting that existing pro-environmental policies serve as a signal about whether and how future environmental policies will evolve. We also examine whether market forces create an incentive for firms to invest in green energy even when faced with local policy uncertainty. We find that strong consumer preferences for green policies mitigate the negative effect of high state policy uncertainty on new green investments. Additional analysis reveals that firms invest in green energy when states' legislative environmental policy uncertainty is resolved. Our findings also indicate that when facing state environmental policy uncertainty, firms hedge "going green" by increasing output from renewable plants but reducing their disposition of fossil fuel plants. Our results suggest that the effects of policy uncertainty vary across different investment and operational decisions."

2. **"Corporate Response to Anti-DEI Pressure: Evidence from SFFA v. Harvard"** with Jaewoo Kim, Kyle Peterson and Laura Wellman
   - **Developed from My First Year Summer Paper**

"Prior research documents firms' substantial efforts to meet demands for diversity, equity, and inclusion (DEI) activities. However, recent years have witnessed a rise in anti-DEI pressure, suggesting that managers face conflicting investor preferences for DEI activities. We examine how firms respond to a shift in preferences for DEI activities, using the Supreme Court's argument in *Students for Fair Admissions (SFFA) v. Harvard* as a shock to anti-DEI pressure. Leveraging novel data from As You Sow (AYS), we analyze firms' DEI disclosure and initiatives, and the disconnect between firms' DEI disclosures and initiatives. We find that firms refrain from discussing DEI topics during their conference calls post-SFFA, while at the same time firms invest more in DEI initiatives (e.g., establishing internal DEI departments and appointing DEI leaders). As a result, firms that previously exhibited high levels of DEI discussion but low levels of DEI actions (i.e., DEI washers) pre-SFFA, experience a reduction in misalignment between DEI

discussion and actions following the Supreme Court's argument. Moreover, DEI washers also experience a reduction in net tone over the same period (i.e., DEI disclosures become less positive). Finally, DEI washers located in places with high stakeholder pressure show a further decline in DEI discussion, misalignment, and net tone, suggesting that the anti-DEI pressure diminishes the incentive for firms to exaggerate their DEI efforts in response to partisan political pressures prior to the SFFA argument. Consequentially, DEI washers experience a further reduction in ESG ownership. Overall, these findings provide novel evidence that anti-DEI pressure have unintended benefits for the DEI information environment."

- 2025 AAA Annual Meeting (Xu, Scheduled)

Work-in-Progress

3. "Cross Border Carbon Tax and Global Supply Chain" with Chengzhu SUN and Frank Weikai Li

CONFERENCE ATTEND

2025 UBCOW at UW (Scheduled)
2025 AAA Annual Meeting (Scheduled)*
2024 First-year Summer Paper Workshop*
2024 UBCOW at UBC
* Presented

TEACHING EXPERIENCES

2026 Introduction to Financial Accounting (Solo Instructor) at UO, Winter term (Scheduled)
Class Capacity: 60
2025 Introduction to Financial Accounting (Lab Instructor) at UO, by Prof. Jennifer Welander, Fall term (Scheduled)
2025 Introduction to Financial Accounting (Lab Instructor) at UO, by Prof. Jennifer Welander, Winter term
2024 Introduction to Financial Accounting (Lab Instructor) at UO, by Prof. Jennifer Welander, Fall term
2024 Introduction to Federal Taxation (Grader) at UO, by Prof. Linda Krull, Winter term
2023 Accounting Data Analytics I (Grader) at UO, by Prof. Stephanie Peel, Fall term
2023 ESG Investment (Teaching Assistant) at HKPolyU, by Prof. Chengzhu SUN, Spring term
2022 ESG Investment (Teaching Assistant) at HKPolyU, by Prof. Chengzhu SUN, Spring term

WORKING EXPERIENCES

Fairvue Partner LLP London, UK
Consulting Intern *Jun 2019 - Aug 2019*
PricewaterhouseCoopers (PwC) Hong Kong
Assurance Intern *Jan 2019 - Jun 2019*
China Construction Bank (CCB) Nanjing, China
Banking Intern *Jun 2018 - Aug 2018*

HONORS AND AWARDS

2025 Robin and Roger Best Research Fund x4 Oregon, US
2024 Robin and Roger Best Research Fund Oregon, US
2023 PhD Program Admission Award Oregon, US
2019 Intern Group Best Story Award London, UK
2019 Off-Shore Work-Integrated Education (WIE) Award HKPolyU, HK
2018 Work-Integrated Education (WIE) Award HKPolyU, HK
2017 "Fight Poverty" Roadshow Competition, First Prize Guizhou, China

LANGUAGES&SKILLS

Languages: Mandarin, English, Cantonese
Programming Languages: SAS, STATA, Python, R
Data Visualization: Tableau, ACL, Qlik Sense
Database: Bloomberg Terminal, Dow Jones Factiva, EDGAR, SDC Platinum, Refinitiv Eikon, CSMAR, DealScan, ASSET4, MSCI ESG Rating, FactSet Supply Chain Relationship, S&P Global Panjiva Shipment Data, Capital IQ conference call scripts, As You Sow Racial Justice Scorecard, TruCost Carbon Emissions data, EIA form 923 and form 860, Gubernatorial elections.

State-Level Environmental Policy Uncertainty and Green Investing and Operating Decisions

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State-Level Environmental Policy Uncertainty and Green Investing and Operating Decisions

Abstract

This paper investigates the effect of state-level environmental policy uncertainty on green investment and operational decisions. We focus on the electric utility industry because we can obtain detailed measures of investment, thereby allowing us to examine decisions regarding assets-in-place and new investments separately, as well as previously unexamined operating decisions. First, we document that high state-level environmental policy uncertainty is, on average, associated with a reduced likelihood of investments in new green plants. Next, we examine whether this association varies for firms operating in states with existing pro-environmental policies (i.e., mandatory renewable portfolio standards). For firms operating in states with mandatory standards, we find that high policy uncertainty does not affect the level of new green plants, suggesting that existing pro-environmental policies serve as a signal about whether and how future environmental policies will evolve. We also examine whether market forces create an incentive for firms to invest in green energy even when faced with local policy uncertainty. We find that strong consumer preferences for green policies mitigate the negative effect of high state policy uncertainty on new green investments. Additional analysis reveals that firms invest in green energy when states' legislative environmental policy uncertainty is resolved. Our findings also indicate that when facing state environmental policy uncertainty, firms hedge "going green" by increasing output from renewable plants but reducing their disposition of fossil fuel plants. Our results suggest that the effects of policy uncertainty vary across different investment and operational decisions.

1. Introduction

In this study, we examine the effect of state-level environmental policy uncertainty on green investment and operational decisions. Prior literature consistently documents that high policy uncertainty leads to lower investment, on average (e.g., Baker et al. 2016; Gulen and Ion 2016; Jens 2017; Julio and Yook 2012). Due to aggregated measures of investment used, these studies have not been able to investigate any variation in the effect of high policy uncertainty across different types of assets. We examine this question in the context of the electric utility industry, where detailed data at the individual asset level are available, allowing us to separately examine the effect of policy uncertainty on decisions regarding new investments and assets-in-place. These data also allow us to investigate how policy uncertainty affects managerial decisions about how investments are used in operations, a question not previously examined. In doing so, we examine whether and how managers potentially hedge against policy uncertainty by leveraging a mix of investment and operational decisions.

The electric utility industry is an important setting to examine for reasons other than the availability of detailed asset-level data. The United States (U.S.) is at a crossroads for climate policy. Following years of legislative gridlock, the federal government has largely failed to deliver substantive policy to mitigate climate change.[1] Despite the lack of progress at the federal level, subnational governments have implemented varying degrees of climate policies, resulting in a fragmented policy landscape. Many state-level policies are targeted at electric utilities

[1]For example, upon re-entering the Paris Agreement, the White House announced that the U.S. would reduce greenhouse gas pollution by 50 - 52% from 2005 levels by 2030. In addition, President Obama and the EPA announced the landmark Clean Power Plan (CPP) in August 2015, introducing the first national standards to reduce carbon pollution from power plants. However, the CPP was later repealed in 2019, along with many other critical Obama—era regulations. After President Biden announced a new National Determined Contribution (NDC) to the Paris Agreement, public attention turned toward the U.S. Reconciliation Bill (Build Back Better Act) to help achieve emissions reductions. While the Build Back Better Act originally contained numerous provisions for climate, including the Clean Electricity Performance Program (CEPP) aimed at utilities, these provisions failed to proceed. Further, the renewable energy tax incentives were repealed in the recent One Big Beautiful Bill Act.

because the power sector accounts for 34% of global greenhouse (GHG) emissions.[2] As of 2021, 30 out of 50 states adopted laws requiring utilities to provide customers with a minimum share of electricity from renewable sources (NCSL 2021). However, the details of these laws vary substantially across states.[3] Critics question whether current standards are sufficient to meet goals for net-zero carbon emissions (Larsen et al. 2021), leading to ongoing debates over whether additional state-level policies are warranted. As a result, utility firms face uncertainty over whether and how to adapt business strategies in a constantly changing regulatory environment.

In this study, we focus on state-level uncertainty, rather than federal-level uncertainty, given the nature of the markets and regulatory environment in which utility firms operate. We define state level environmental policy uncertainty as uncertainty about whether environmental policies will change and how policy changes will impact firms' investing and operating decisions (Pástor and Veronesi 2012, 2013). Our view of state-level environmental policy uncertainty is broad, encompassing uncertainty about environmental policy rulemaking by elected officials as well as administrative officials.

Despite prior research linking federal policy uncertainty to depressed overall investment by firms on average (e.g., Baker et al. 2016; Gulen and Ion 2016; Jens 2017; Julio and Yook 2012), it is unclear whether and how subnational policy environmental uncertainty will impact different types of investment and operational decisions, namely investments in and output of new

[2] According to the EPA, electricity and heat production accounted for 34% of the 2019 global greenhouse emissions (see https://www.epa.gov/ghgemissions/global-greenhouse-gas-overview). In the United States, the top emitter of greenhouse gasses in 2021 was Vistra Energy, a Fortune 500 integrated retail electricity and power generation company, and all companies in the top 10 of greenhouse emissions in 2021 were in the power plant industrial sector (see https://peri.umass.edu/greenhouse-100-polluters-index-current).

[3] For example, several states have voluntary renewable energy policies (e.g., Utah and Indiana) whereas other states have policies that have multiple compliance horizons with increasing renewable energy requirements (e.g., California and New Mexico).

green plants and divestitures of fossil fuel plants. On one hand, utility companies face unique challenges with respect to managing costs and estimating investment horizons. For example, when transitioning from fossil fuels to renewable energy sources, utility firms are subject to heightened costs, largely due to inflated input prices that stem from a lack of economies of scale in the industry (IRENA 2021). In addition, firms face uncertainty over which green investments to pursue, particularly given the long horizons needed to observe the link between inputs (i.e., investments in new green plants) and outputs (i.e., a significant reduction in environmental impact), which produces challenges when measuring environmental performance (Grewal and Serafeim 2020). Finally, existing and proposed regulations affect both costs (i.e., by providing incentives to the utility firms and/or their suppliers) and investment horizons (i.e., the timing and quantity of renewable energy obtained). Together, these factors suggest that utility firms are plausibly more sensitive to state environmental policy uncertainty when determining which plants to operate.

On the other hand, utility firms may be less sensitive to state environmental policy uncertainty to the extent existing climate policies incentivize firms to increase their investment in green energy and/or provide a signal about future policy developments. For example, in 2007 Minnesota passed its first renewable portfolio standard. Then in 2013 the state added an additional requirement specifically regarding solar energy generation. Most recently in 2023 the state updated their existing regulatory standards to 100% clean energy by 2040. If existing policies provide a signal of how future policies will evolve, the process of adopting policies that are increasingly pro-environmental suggests that plants operating in Minnesota are potentially less sensitive to state environmental policy uncertainty. In addition, climate policy is a partisan issue and consumer preferences for green energy vary (Kennedy et al. 2023). Overall, these

considerations suggest that existing policies and/or market forces may reduce utility firms' sensitivity to policy uncertainty. Thus, we also investigate the role of current regulatory standards at the state level in signaling future policy developments, as well as consumer preferences within the state in affecting the relation between policy uncertainty and firms' investment decisions.

We modify the Baker et al. (2022) index of economic policy uncertainty at the state level to measure state-level *environmental* policy uncertainty. Baker et al. (2022) develop state-level economic policy uncertainty indices and validate these indices using gubernatorial elections and own-state policy events. Following a process similar to Baker et al. (2022), we use NewsBank, a database of state and local newspapers, to identify articles that contain 1) an environmental policy term from Palikhe et al. (2024), 2) a state-level policy term using Baker et al.'s (2022) collection of terms designed to disentangle state and local from national sources of uncertainty, and 3) an uncertainty term from Baker et al.'s (2022) list.[4] Using the count of news articles that contain at least one term from each of the three lists, we construct an index that is increasing in environmental policy uncertainty. Conceptually, like Baker et al. (2022), our measure has broad appeal because it measures uncertainty related to all state-level environmental policies at various stages of implementation and enforcement. As discussed in Baker et al. (2016), indexes based on newspaper text can provide useful proxies for underlying economic and policy conditions. To address the concern that our primary findings are attributable to macroeconomic factors rather than environmental policy uncertainty (Akey et al. 2024), we corroborate our results using measures of uncertainty based on gubernatorial elections (Jens 2017).

[4] For example, the set of terms include relevant state and local officials, policy-making bodies, and regulatory agencies. To assemble the terms, Baker et al. (2022) consulted government websites for the titles of officials and names of legislatures and state bodies with authority over various regulations (Baker et al. 2022, pg. 84). The full list of terms is summarized in Appendix Table A.1 of Baker et al. (2022).

We begin by analyzing firms' actual investments in new renewable power ("green") plants to determine if the prior findings hold for this type of new investment. In addition to measuring current green investment decisions by identifying the number of new green plants that become operational in the subsequent two years, we consider a secondary measure based on initial announcements of renewable generators expected to be built at plants. Forecasted renewable generators measure firms' intentions to invest in new green energy sources and do not require us to specify an ex-post time horizon to capture firms' current green investing decisions. Together, these measures allow us to investigate a link between environmental policy uncertainty and new green investments despite inherent horizon issues.

We document that high environmental policy uncertainty at the state level is associated with lower number of new renewable energy plants in the subsequent two years after controlling for other determinants of investment decisions. The results suggest that this association is economically meaningful; firms begin operations at 32% fewer new green plants in the two years following high environmental policy uncertainty in the state. In aggregate, high environmental policy uncertainty delays the construction of 75 renewable power plants. We also document that firms increase their green investments once the environmental policy at the state level is resolved through additional legislation. These findings support prior studies that uncertainty limits investment decisions until that uncertainty is resolved.

We also examine whether the association between state-level environmental policy uncertainty and investment decisions varies with current regulatory policies at the state level. Many states have adopted renewable portfolio standards that require utility companies to generate a specified percentage of the electricity from renewable sources. We argue that the presence or absence of these renewable portfolio standards provide a signal about likely future

policy developments within that state. They may also provide incentives for firms to increase their investment in green energy despite ongoing debate over additional environmental reforms.

Consistent with our full sample results, we document a negative association between state-level policy uncertainty and the number of new green plants in states without renewable portfolio standards. However, contrary to the average negative effect of uncertainty on investments documented in the prior literature, high policy uncertainty is *not* associated with the level of new green plants in the subsequent two years in states with renewable portfolio standards. One possible explanation for this finding is that existing standards at the state level increase firms' tolerance for regulatory uncertainty by providing a signal about the likely resolution of ongoing policy debates. Together, these results suggest that existing regulations at the state level offset the on average negative effect of policy uncertainty on firms' new investment decisions.

We also consider whether market forces create an incentive to make new investments even in the face of state policy uncertainty. To investigate this question, we create a state-level measure of consumers' green energy policy preferences based on the Yale University's Climate Opinion Survey (Howe et al. 2015). We find that in states with low consumer demand for green energy policies, high state environmental policy uncertainty is associated with lower future green investment, consistent with our full sample results. In contrast to prior findings in the literature, strong consumer demand for green energy policies encourages new green investment such that when firms face high levels of uncertainty about environmental policies, they continue to invest in green energy assets.

In addition to examining the decision to invest in new green assets, we also consider managerial decisions related to existing investments. The availability of detailed plant-level data

in the electric utility industry allows us to move beyond prior research by investigating decisions related to assets-in-place as well as operational decisions. In these analyses, we study the impact of policy uncertainty on the percentage of a firm's output that is generated from renewable plants and the divestitures of nonrenewable power ("fossil fuel") plants. In doing so, we shed light on how environmental policy uncertainty affects firms' decisions of how to utilize their existing investments.

We document that high state environmental policy uncertainty is associated with a greater percentage of firms' energy output coming from renewable plants. We also find that this result is concentrated in states that have high consumer preferences for green energy. This finding suggests that, in the face of uncertainty about future state-level environmental policies and strong consumer preferences for green energy, firms hedge high environmental policy uncertainty by shifting their output to renewable power plants instead of additional investments in green plants.

Consistent with hedging, we find that firms are also *less* likely to dispose of fossil fuel plants in the subsequent two years when facing high state environmental policy uncertainty. Our results suggest that this finding is economically significant; in aggregate, high environmental policy uncertainty reduces the disposal of fossil fuel plants by 9%. Thus, while prior research generally explores firms' tendency to delay or forgo *new* investments during high policy uncertainty periods, our evidence suggests that policy uncertainty induces firms to *maintain* their existing levels of investments through the decision to not divest fossil fuel plants. One possible explanation for this finding, suggested by prior work examining variation in the effect of policy uncertainty on new investment decisions (e.g., Bonaime et al. 2018; Gulen and Ion 2016), is that divesting of a fossil fuel plant is not easily reversible. Taken together, these results highlight the

operational and investment decisions firms make in managing high state environmental policy uncertainty.

Our study makes several contributions to the literature. First, we are able to shed light on the differential effects of policy uncertainty across asset types as well as decisions on how to utilize those assets. While our findings are limited to electric utility firms, our focus on a single, homogeneous industry permits a consideration of the characteristics of investment decisions beyond their long-term nature and irreversibility. Further, our ability to observe plant-level decisions on product mixes allows us to investigate how managers respond at the disaggregated plant level to policy uncertainty. Consistent with prior work, we show that high environmental policy uncertainty is associated with lower new investments in green assets, suggesting that our setting is similar in key respects to industries examined in other studies. However, high policy uncertainty is also associated with an increased likelihood that existing assets in place (i.e., fossil fuel plants) are maintained. We believe these findings would generalize to other settings where the assets in place represent significant investments by the firm that are difficult to reverse. Moreover, policy uncertainty impacts how managers utilize existing assets in operational decisions. This nuanced understanding of the effect of policy uncertainty is new to the literature.

We also examine the dynamics between policy uncertainty, regulations, and market forces. Our setting is a powerful one to examine these dynamics because firms in highly regulated industries, such as the utility industry, are likely to be the most sensitive to the effects of policy uncertainty. Our results suggest that early state-level regulations and market forces mitigate the role of policy uncertainty in shaping firms' investment decisions even as uncertainty about the likelihood of new policies and expected impact of those policies persists. We find prior state-level green regulations and strong consumer preferences overcome the negative impact of

policy uncertainty on investing decisions. This analysis provides a first step to understanding how firms incorporate consumer preferences into their decisions in light of significant uncertainty. While our results pertain only to the utility industry, we conjecture that market forces would have an even greater effect in less regulated industries.

Finally, our study also contributes to the burgeoning literature on corporate socially responsible activities. Understanding utility firms' investment decisions is critical in studying the long-run conversion to a green economy. The efficacy of corporate sustainability practices is debated in the literature, especially in the absence of regulation. For example, Bebchuk and Tallarita (2020) and (2022) conclude that there are insufficient incentives to encourage managers to engage in these activities and protect stakeholder interest (see also Bebchuk et al. 2021). We provide evidence in one setting where consumer preferences for socially responsible activities encourage managers to engage in green initiatives.

2. Prior Literature and Background

2.1 Policy Uncertainty and New Investments

There is extensive evidence in the literature that uncertainty is negatively associated with firms' new investment decisions. This negative association is attributed to the irreversibility and adjustment costs of investment. As a result of the uncertainty, there is an option value to waiting for new information to arrive, and firms respond by delaying and/or lowering their investment (e.g., Bernanke 1983). Consistent with this explanation, McDonald and Siegel (1986) demonstrate that uncertainty is positively associated with the required rate of return on a firm's investment decisions (see also Pindyck and Solimano 1993; Dixit and Pindyck 1994; Leahy and

Whited 1996; Bloom et al. 2007; Baum et al. 2008; Julio and Yook 2012; Pástor and Veronesi 2012).

One source of firm uncertainty is the government's power to set policies and to change them (Pástor and Veronesi 2012, 2013). Prior research focuses on national measures of policy uncertainty to demonstrate the negative effects of policy uncertainty for aggregate and firm-level investment. The papers in this literature use several different approaches to measure national policy uncertainty, ranging from electoral cycles, monetary and fiscal policy, specific reforms, tax incentives, to survey data (e.g., Rodrik 1991; Hassett and Metcalf 1999; Driver et al. 2004; Bontempi et al. 2010; Fernández-Villaverde et al. 2015; Julio and Yook 2012; Bianco et al. 2013; Hu et al. 2023). A recent line of work uses the index of aggregate U.S. policy uncertainty developed by Baker et al. (2016). This economic policy uncertainty (EPU) index is based on the frequency of terms related to economics, policy, and uncertainty in 10 leading U.S. newspapers. Baker et al. (2016) provide evidence both at the micro firm-level and the macro country-level that higher EPU levels are associated with lower levels of firm-specific and aggregate investment.

Studies have also examined cross-sectional variation in this relation between EPU and investment. For example, Gulen and Ion (2016) document a negative relation between firm-level capital investments and policy uncertainty that varies cross-sectionally with the irreversibility of a firm's investment. They find that this negative relation is stronger for firms with a higher degree of investment irreversibility and for firms that are more dependent on government spending. Kang et al. (2014) document that the negative effect of economic policy uncertainty on firm-level investment is pronounced for firms with higher firm-level uncertainty and during recessionary periods. Bonaime et al. (2018) document that merger and acquisition activity is

negatively associated with policy uncertainty, both at the macro and firm levels. They show that this negative association is mitigated when the deals are more easily reversible, are necessary for competitive reasons, and for deals that hedge firm risk. The conclusions from this literature suggest that uncertainty about national economic policy is an important factor in the overall level of uncertainty faced by the firm.

State and local policy is also a source of uncertainty for firms. State and local governments differ along several dimensions related to policy. Some of these differences include design of regulations (e.g., environmental regulations, land-use policies, tax systems, health and safety regulations), energy sources and prices, industry mix, and exposure to and dependance on federal-level funding and policies (Baker et al. 2022). Studies examining the effect of local policy uncertainty on firm investment primarily use uncertainty stemming from local elections. For example, Jens (2017) documents a significant decline in the level of investment for firms whose headquarters are in a state with a gubernatorial election in the following quarter relative to firms headquartered in states without an upcoming gubernatorial election. This decline is greater for firms more susceptible to changes in state policy, as proxied by firm size, the extent of the investment opportunity set, political sensitivity, and disinvestment costs. Amore and Minichilli (2018) focus on local political uncertainty for Italian firms, and document that high local political uncertainty leads to lower firm investment. This negative relation is exacerbated for firms with greater exposure to politics but is mitigated for family-owned firms.

In our setting, we are interested in uncertainty surrounding environmental policies, which have significant implications for firms' investment and operating decisions.[5] We argue that the

[5] Environmental policies can also have implications for the rates utilities are able to charge. We focus on firms' investment and operational decisions because these decisions are a choice firms can make. By contrast, the rates utility firms in regulated markets charge are set by public utility commissions. Further, utility firms have more direct

main source of uncertainty surrounding environmental policies is at the local level. For example, prior efforts by the federal government to promote a shift from fossil fuels to renewable energy sources have been met with varying degrees of support by local governments across the fifty states.[6] The importance of local level policies is especially pronounced in the utility industry we study, given the regulatory environment (discussed further in Section 2.3).

As discussed in detail in Section 3.3, we construct a proxy for time-varying local environmental policy uncertainty that considers sources of both environmental policy uncertainty and state-level policy uncertainty (Palikhe et al. 2024; Baker et al. 2022). Measuring local environmental policy uncertainty using election cycles offers the benefit of occurring at pre-specified intervals and thus is not correlated with economic conditions, unlike text-based measures of uncertainty (see Akey et al. 2024). However, when electoral uncertainty dissipates, the set of policies that will remain or change is uncertain as newly elected officials pursue their agendas alongside incumbents. Moreover, environmental policy uncertainty also extends beyond elected officials and includes policies developed and enforced by administrative and regulatory officials. Compared to prior studies that focus on specific periods surrounding elections, the measure of state-level environmental policy uncertainty that we use in our main tests allows us to consider a broader view of ongoing environmental policy uncertainty at the state-level. We assess the sensitivity of our results to using election-based measures in Section 6.

2.2. Local Policy Uncertainty and Corporate Socially Responsible Activities

We examine the effect of local policy uncertainty on firms' investment and operational decisions related to environmental assets. We expect local climate-related policy uncertainty to

tools to hedge price uncertainty (such as futures and forwards); data on these means to hedge price uncertainty are generally unobservable to researchers.

[6] See https://www.ncsl.org/environment-and-natural-resources/state-and-federal-environmental-justice-efforts.

have a meaningful impact on these decisions since firms are often unsure about which environmental strategies to adopt and when to adopt them given the long horizons needed to observe the impact of these sustainable strategies (Serafeim et al. 2019; Kotsantonis and Serafeim 2020). Specifically, many climate-related policies are associated with long-term goals[7], and the business decisions needed to achieve those goals require a mix of short-term and long-term investment and operating decisions. Thus, firms may be reluctant to make costly adjustments to business operations and investment strategies in the face of ongoing policy uncertainty.

We also investigate what forces might motivate firms to make new sustainable investing decisions in the face of high policy uncertainty. We hypothesize that when states have a history of either anti- or pro-environmental reforms and/or have provided long-term goals, the negative impact of current policy uncertainty is mitigated for long-horizon decisions. We also examine whether market forces can offset the negative effects of policy uncertainty on operating and investment decisions. The role of market forces is important given the recent line of research calling into question the efficacy of corporate sustainability practices (Bebchuk and Tallarita 2020 and 2022; Bebchuk et al. 2021). These studies conclude that managers lack sufficient incentives to protect stakeholder interests in the absence of regulation. Specifically, these studies question the view that market forces and self-regulation limit the need for government intervention.

[7] For example, upon re-entering the Paris Agreement against a backdrop of rising temperatures, unprecedented wildfires, hurricanes, and flooding, the White House announced that the U.S. would reduce greenhouse gas pollution by 50 - 52% from 2005 levels by 2030 (United Nations 2015; White House 2021).

2.3 Background on the Electric Utility Industry

Utility companies in the United States generate and distribute electricity to four end-use sectors (residential, commercial, industrial, and transportation) and to Canada and Mexico. In 2014, there were over 6,500 operational power plants supplying energy to over 147 million residential, commercial, and industrial consumers (Department of Energy 2017). Energy can be generated either by nonrenewable or renewable means. Nonrenewable sources of energy include fossil fuels (petroleum, natural gas, and coal, commonly known as "dirty" sources) and nuclear energy. Renewable sources of energy include hydroelectric power, geothermal, biomass, solar, and wind. The majority of energy consumption in the United States, 86.8%, is currently from nonrenewable sources.[8]

Electricity is considered a critical commodity and as such, firms in this industry face significant regulations. In the United States, utility companies are regulated at both the federal and local level. At the federal level, the Federal Energy Regulatory Commission (FERC), an independent agency under the Department of Energy (DOE), oversees wholesale sales and transmission of electricity in interstate commerce.[9] FERC is also responsible for reviewing certain M&A transactions made by public utilities, monitoring hydroelectric projects, setting and enforcing mandatory reliability standards, and monitoring electricity markets and investigating irregularities in those markets. The Environmental Protection Agency (EPA), a federal agency, regulates greenhouse gas emissions from power plants.

[8] According to the April 2023 Monthly Energy Review from the U.S. Energy Information Administration, nonrenewable energy consumption is 35.7% petroleum, 33.3% natural gas, 9.8% coal, and 8% nuclear. Renewable energy consumption is 4.9% biomass, 2.3% conventional hydroelectric power, 3.8% wind, 1.9% solar, and 0.2% geothermal (see https://www.eia.gov/energyexplained/what-is-energy/sources-of-energy.php).

[9] Federal energy policies are primarily established and implemented by the DOE, although FERC can use its regulatory oversight of wholesale markets to also implement federal policies.

State and local entities regulate the local distribution and sales of electricity to retail consumers, often through individual state public utilities commissions. States also have jurisdiction over the location and construction of transmission facilities, generation facilities, and distribution systems. When a proposed facility involves two or more states, the firm must obtain regulatory approval from each state's public utility commission as well as any other relevant state agency. State environmental agencies also implement state and some federal environmental laws and regulations that apply to the utility industry.

As discussed in Sundback et al. (2020), the oversight of FERC, the Department of Energy, other federal bodies, and local regulatory entities often overlap and conflict, resulting in a "complex web of legal, regulatory, economic, technical and environmental implications" for utility companies (p. 2, see also Figure A-5, Department of Energy 2017). Advances have made the overlap between federal and state regulations even more pronounced. For example, new technologies, including distributed energy resources, can be interconnected to the transmission grid regulated by FERC as well as the local distribution system regulated by local public utility commissions, and/or can provide several types of wholesale and retail grid services (Department of Energy 2017).

A recent trend noted by Sundback et al. (2020) is that states are the primary drivers of renewable energy development and policy. States encourage and/or enforce the expansion of renewable energy through proposing and enacting legislation. While federal tax credits and grants exist to encourage the production and use of renewable energy, there is currently no federal renewable energy target mandate.[10] As a consequence, many states have established renewable portfolio standards (RPS). These standards typically require investor-owned electric

[10] The Biden Administration announced a goal for the U.S. to have 80% of electricity generated from renewable resources by 2030; however, this goal was not mandated.

utilities to generate a certain percentage of the energy provided to customers in a state from renewable sources.

3. Sample and Variable Construction

3.1 Sample

From the CRSP and COMPUSTAT universe, we select the 101 publicly traded electric utility companies, which we identify as firms with a CRSP or COMPUSTAT 4-digit header SIC code of "4911 – Electric Services" or "4931 – Electric & Other Services Combined" at any point during our sample period, 2011 to 2020. To ensure we are examining firms with similar regulatory environments, we further restrict the sample to U.S. firms (i.e., firms with the COMPUSTAT variable "*FIC*" equal to "USA"). This step reduces the sample to 78 unique firms. From this listing of firms, we hand match firms to electric generating plant-level data from the U.S. Energy Information Administration's ("EIA") website to identify those firms that generate electricity.[11] As shown in Panel A of Table 1, this results in our final sample of 63 U.S. publicly traded firms representing 406 firm-year observations that generate electricity.

To identify power plants owned by our 63 firms, we obtain plant-level data for electricity-generating power plants from the annual EIA Form 923 files for calendar years 2011 through 2020.[12] Per Form 923's instructions, Form 923 is a mandatory report for all electric power plants in the U.S. that have a total generator capacity of at least one megawatt, and whose generator or facility is connected to the electric power grid with the ability to draw or deliver

[11] This step further reduces our sample size because SIC Codes 4911 and 4931 contain utility companies that both buy electricity then provide electricity to customers and companies that generate electricity. Our sample only retains firms that generate electricity as we are interested in firms' investments in different asset types to generate electricity.

[12] Data is accessible at https://www.eia.gov/electricity/data.php.

electricity to the grid. Form 923 covers approximately 10,000 power plants that report information at least annually. From Form 923, we obtain plant-level data on net electricity generated, fuel sources, and geographic location for this study.

Using Form 923 and Form 10-K, we match the 63 public firms in our final sample to the power plants they own for all years between 2011 and 2020 using a two-step process. In the first step, we manually review firms' subsidiary lists from Exhibit 21 within their Form 10-K and compare subsidiary names to plant names and plant operator names within EIA's Form 923 data. As robustness, we execute a second step where we manually review firms' Item 2 "Properties" section within Form 10-K and match the power plant names from this section to power plant names in the Form 923 data.[13] From our manual matching process, we identify 3,123 unique power plants that were publicly owned for at least one year during our sample period.

Using the power plant level data, we categorize power plants as either nonrenewable plants or renewable plants based on their primary fuel source.[14] We identify a plant as a renewable ("green") plant if the primary fuel source is geothermal ("GEO"), hydroelectric pump storage ("HPS"), hydroelectric conventional ("HYC"), solar ("SUN"), or wind ("WND").[15] We identify renewable electric sources in accordance with the United Nations Intergovernmental Panel on Climate Change's Fifth Assessment Report (IPCC 2014).[16] We identify a plant as nonrenewable ("fossil fuel") if its Form 923's fuel source code is not one of the renewable

[13] Item 2 "Properties" is a mandatory reporting section within Form 10-K and contains information on the properties a firm and its consolidated subsidiaries own. For electric utility companies, this section typically includes a list of all power plants the company owns.
[14] We define the primary fuel source as the fuel source a power plant utilizes to generate the majority of its electricity.
[15] We exclude plants with nuclear ("NUC") as a primary fuel type due to the highly regulated nature of nuclear power plants in the U.S. There has only been one nuclear reactor constructed within the U.S. since 1996 and no new nuclear power plants. In addition, there are certain operator license restrictions which limit changes in ownership and disposition of nuclear plants.
[16] We are unable to identify a specific Form 923 Fuel Type Code(s) attributable to bioenergy, which is a renewable energy source noted by IPCC (2014).

energy codes. The most common nonrenewable fuel sources are petroleum coke ("PC"), coal ("COL"), natural gas ("NG"), Residual Petroleum ("RFO"), or Distillate Petroleum ("DFO").[17] Based on these measures, we find that non-renewables (renewables) accounted for 88% (12%) of all electricity generated during our sample period (not tabulated). From this sample of 3,123 unique power plants, we have 2,459 firm-state-year observations with sufficient data to construct our variables.

3.2 New Green Investments

We construct two measures of new green investments at the firm-state-year level. Our first variable, *#NewGreenPlants*, is the number of renewable plants that began operations in which the firm has an ownership interest over the subsequent two years.[18] We measure *#NewGreenPlants* over a two-year window, *t+1* and *t+2*, as the utility industry is a highly regulated industry and, as such, plant construction often requires lengthy regulatory approval. Construction of renewable plants can range from less than one year for solar plants to 18 months for a wind farm to five or more years for a hydro facility (IPCC 2014). Thus, measuring green investing activity over a two-year period allows us to better capture a firm's green investing activity based on a firm's decisions in year *t*.[19] As shown in Panel B of Table 1, the mean of *#NewGreenPlants* is 0.42.

Our second measure of new green investing activity, *#NewGreenAnnounceCt*, is the number of plants where the firm announces in year *t* that it intends to place at least one

[17] Although firms often tout their natural gas plants (especially when they are converting from coal to a natural gas) as environmentally-friendly, we do not include these plants in our measures of green investing activity given the use of a nonrenewable energy source.
[18] EIA Form 923 is only required for operational plants. Therefore, *#NewGreenPlants* captures newly constructed plants that become operational during the measurement window. It does not include plants that are still under construction.
[19] During our sample period, solar and wind represented the largest increases in renewable electricity production (IEA 2020).

renewable energy generator in the future. We obtain the firm's forecasted number of plants with new renewable generators from EIA Form 860. In contrast to *#NewGreenPlants, #NewGreenAnnounceCt* measures firm's intentions to invest in new green generators in the near future and does not require us to specify a time period to measure green investing activity. However, not all firms forecast all renewable investments in a timely manner; as shown in Panel B of Table 1, the mean of *#NewGreenAnnounceCt* is 0.13.[20] As expected, the correlation between *#NewGreenPlants* and *#NewGreenAnnounceCt* is positive and significant (0.69, $p < 0.01$, not tabulated).

3.3 Policy Uncertainty

To capture the uncertainty in the regulatory environment faced by electric utility companies, we examine the level of policy uncertainty related to the environment at the state level. We focus on environmental policy uncertainty at the state level given the nature of the regulatory environment faced by electric utility plants. As discussed in Section 2.3, all states have energy commissions that oversee the provision of electricity within their state, and the bulk of policy devoted to green investment is at the state level.

To measure environmental policy uncertainty at the state level, we follow the general approach in Baker et al. (2022) where they construct an index (EPU_{State}) to capture state policy uncertainty.[21] To construct this index, Baker et al. (2022) measure the fraction of articles in daily and weekly newspapers from NewsBank for each state that contains terms (specific to each state)

[20] Due to data limitations, for each plant we retain only the first instance of a firm announcing that they plan to invest in a new renewable generator at a plant. To construct this measure, we assume the firm that owned the plant when it subsequently began operations was the same firm that announced the plant.

[21] The EPU indices are available at https://www.HighPolicyUncertainty.com/state_epu.html. This site also provides the U.S. Climate Policy Uncertainty (CPU) index developed by Gavriilidis (2021). We do not utilize this monthly measure as it is not available at the state level.

regarding the economy, uncertainty, and policy.[22] We utilize the lists of uncertainty terms and policy terms specific to each state from Baker et al. (2022). We also incorporate a list of environmental policy terms, which we obtain from Palikhe et al. (2024). Following Baker et al.'s (2022) methodology, we count the number of articles for each state-year that contain at least one term from each list (i.e., uncertainty terms, policy terms specific to each state, and environmental policy terms) to identify environmental policy uncertainty articles. We then scale the count of environmental policy uncertainty articles by the total number of all articles for each state-year in the NewsBank database to calculate the percentage of environmental policy uncertainty articles for each state-year. Using the percentage of environmental policy uncertainty articles for each state-year pair from 2000 through 2023, we create an index, where the mean percentage of environmental policy uncertainty articles is equal to an index value of 100. Using state-year index values from 2010 through 2018 we construct an indicator variable, *HighEnvPolicyUncert*, which is equal to one if the annual environmental policy uncertainty index value for state *s* in year *t* is greater than the 75th percentile, zero otherwise. As seen in Panel B of Table 1, the mean of *HighEnvPolicyUncert*, is 0.23, indicating that 23% of our firm-state-year observations are classified as having high environmental policy uncertainty. Baker et al. (2016) note that indexes based on newspaper texts can provide a useful summary measure for underlying economic and policy conditions. To ensure that our results are not driven by state-level macroeconomic factors rather than policy uncertainty (Akey et al. 2024), we assess the sensitivity of our results to alternative measures of state policy uncertainty based on gubernatorial elections in Section 6 (Jens 2017).

[22] Baker et al. (2022) identify various sources of policy uncertainty including elections, variation in how states adopt federal policies, and more. The state-specific EPU term sets are provided at https://www.HighPolicyUncertainty.com/state_epu_terms.html.

3.4 Control Variables

We follow prior research to identify firm characteristics associated with investment decisions. Following Hubbard (1997) and Badertscher et al. (2013), we include measures associated with the firm's ability to invest and its investment opportunities as of the beginning of the year. We measure firm size, *LnSize*, as the natural logarithm of market capitalization of the firm as of the beginning of year *t*. Operating cash flow, *OCF*, a proxy for the firm's level of financial constraints, is defined as the firm's operating cash flow in year *t-1* divided by average total assets for year *t-1*. We use sales revenue growth, *SalesGrowth*, defined as the percentage change in the firm's revenue from year *t-2* to year *t*-1, as a proxy for the firm's growth opportunities. We also include *TangAssets*, the ratio of the firm's tangible assets over total assets as of the beginning of year *t.* To proxy for the firm's investment opportunity set, we construct the firm's Tobin's Q ratio, *Q*, calculated as the ratio of the sum of the firm's market value of equity and book value of debt divided by the book value of assets as of the beginning of year *t*.[23] Descriptive statistics for these control variables are provided in Panel B of Table 1.

4. Environmental Policy Uncertainty and New Green Investment

In this section, we examine the association between environmental policy uncertainty and new green investments. We first estimate this association for our entire sample (Section 4.1) and then examine cross-sectional variation in this association conditional on the existence of a state mandatory RPS (Section 4.2) and consumer preferences for green energy (Section 4.3). Finally,

[23] The results presented are insensitive to including *Cash* (the level of the firm's cash and short-term investments divided by the firm's total assets as of the beginning of year *t*), *CapEx* (the firm's capital expenditures in year *t-1* divided by total assets as of the beginning of year *t-1*), and *Leverage* (the firm's short- and long-term debt divided by total assets as of the beginning of year *t*) as additional control variables.

in Section 4.4, we investigate firms' green investment decisions when environmental state policy uncertainty is resolved.

4.1 Relation Between Environmental Policy Uncertainty and Green Investment Decisions

To investigate the relation between policy uncertainty and firms' future green investing activity, we estimate the following Poisson model for our sample of firm-state-year observations:

$$GreenInvesting_{i,s,t} = \beta_1 HighEnvPolicyUncert_{s,t} + Controls_{i,t} + Year_{FE} + \varepsilon \quad (1)$$

where *GreenInvesting* measures green investing decisions for firm *i* in state *s* in year *t,* as captured by either *#NewGreenPlants* or *#NewGreenAnnounceCt*. Our variable of interest is *HighEnvPolicyUncert*, which indicates if state *s* has high environmental policy uncertainty in year *t*. If state-level policy uncertainty is a cost managers consider in their green investing decisions, we expect *HighEnvPolicyUncert* to be negatively associated with *GreenInvesting* ($\beta_1 < 0$). Equation (1) includes the following vector of firm-level controls, which are associated with firms' investing activities: the natural log of market capitalization (*LnSize*), operating cash flow (*OCF*), sales growth (*SalesGrowth*), percentage of tangible assets (*TangAssets*), and Tobin's Q (*Q*). We estimate our model with no fixed effects, with year fixed effects to control for general economic trends, time-series trends in environmental policy uncertainty, and green investing activity, and with firm and year fixed effects to control for both time-series trends and systematic differences across firms in green investing activity. We cluster the standard errors in the model at the firm level (Petersen 2008). In estimating the Poisson model, we make the adjustment for high dimensional fixed effects from Cohn et al. (2022); all results hold if we do not adjust for high dimensional fixed effects. The inferences discussed below also hold if we instead estimate equation (1) using a negative binomial model, transform the dependent variable by adding one and taking the natural log and then use OLS estimation techniques, or replace the dependent

variable with an indicator variable that equals 1 for new green investment, 0 otherwise, and then use logit estimation techniques.

The results from estimating equation (1) are provided in Table 2. Consistent with our predictions, the estimated coefficient on *HighEnvPolicyUncert* is negative and when we use *#NewGreenPlants* to capture green investing (columns (1) - (3)). This result is consistent with prior literature documenting that high policy uncertainty is associated with lower investing activity. The estimated coefficient in column (1) (-0.386) indicates that when a firm faces high environmental policy uncertainty in the state, they begin operations at 0.13 fewer new green plants in the following two years, which is a 32% reduction relative to the mean of *#NewGreenPlants* (0.42). Aggregating across our sample firms and time period, this effect equates to 75 fewer investments in new green plants during our sample period in states characterized by high levels of environmental policy uncertainty.

We do not, however, find a significantly negative association between high state environmental policy uncertainty and announcements of future renewable energy generators (columns (4) - (6)). One possible explanation is that firms' decisions to voluntarily disclose their investment plans are affected by factors other than state environmental policy uncertainty. Alternatively, there are factors that differentially affect firms' disclosure as well as its investing decisions in this highly regulated industry. We examine two such factors, mandatory state renewable portfolio standards and consumer preferences, in the next subsections.

4.2 Cross-Sectional Variation in New Green Investment with Mandatory State Renewable Portfolio Standards

In this subsection, we investigate whether the current regulatory environment influences firms' sensitivity to uncertainty about whether and how environmental policies will change. To

do this, we investigate cross-sectional variation in existing state-level energy regulations. Over 30 states have initiated either voluntary or mandatory state-level renewable energy requirements (collectively known as Renewable Portfolio Standards or RPS) for investor-owned electric generators, likely in response to the lack of a federal standard or possibly to discourage federal intervention. As discussed in Section 2.3, RPS typically require investor-owned electric utilities to generate a certain percentage of the energy provided to customers in a state from renewable sources. Although Iowa established the first RPS in 1983, most other states initiated RPS in the early 2000s. The RPS placed into law in the 2000s typically set initial compliance dates between 2010 and 2020. In our sample, 70% of our firm-state-year observations correspond to states with some form of a mandatory RPS during our sample period (results not tabulated).[24]

To comply with RPS, most states require firms to provide annual reports demonstrating that the firm generated a sufficient amount of electricity from eligible renewable resources. This amount of electricity from renewable resources is monitored through renewable energy credits (RECs). One REC typically represents one megawatt of electricity generated from a renewable resource; many states, however, do not necessarily require that RECs originate from a renewable power plant located within the state. Rather, firms have three primary options to meet the required number of RECs. First, a firm can generate electricity from any renewable energy plant owned by the firm, often regardless of the state in which the plant is located. Second, the firm can engage in a Purchase Power Agreement (PPA) to buy electricity from a renewable energy plant. Third, the firm can purchase RECs from the secondary market. Particularly germane to our

[24] There is a wide dispersion in how states enforce compliance with RPS. A handful of states define their RPS as voluntary and have no penalties for non-compliant firms. We categorize a state as having a mandatory RPS if they have laws requiring compliance with the standard.

study, the second and third compliance options do not require long-term capital investments by firms.

In theory, RPS encourage firms to increase their green investing, particularly if current environmental regulations provide a signal about future environmental policy developments. As a result, we expect that the negative relation between state environmental policy uncertainty and future green investment is stronger in states without a mandatory RPS. However, there are features of how RPS are implemented that might lead to no cross-sectional variation in the relation between state environmental policy uncertainty and green investment with the existence of RPS. First, as discussed above, compliance options exist, such as entering into a PPA or purchasing RECs on the secondary market, that do not require firms to make capital investments. Second, even if firms do choose to make green capital investments to comply with a state's RPS, RPSs often do not necessitate that firms invest within that state's borders. Therefore, it is unclear if RPS mitigate the impact of state-level environmental policy uncertainty on firms' future green investing decisions within that state. To examine how RPS affect the association between state policy uncertainty and future green investment, we estimate the following Poisson model:

$$GreenInvesting_{i,s,t} = \beta_1 HighEnvPolicyUncert_{s,t} + \beta_2 RPS_{s,t} + \beta_3 HighEnvPolicyUncert_{s,t} * RPS_{s,t} + Controls_{i,t} + Year_{FE} + \varepsilon \quad (2)$$

Equation (2) augments equation (1) with *RPS,* an indicator variable that equals one if a state has a mandatory RPS, zero otherwise, as well as the interaction of *RPS* with our state environmental policy uncertainty variable. If firms view state-level RPS as a signal of the local governments' environmental policy preferences, we predict a negative coefficient on *HighEnvPolicyUncert*, indicating that environmental policy uncertainty negatively impacts green investment decisions in the absence of a mandatory RPS, and a positive coefficient on the interaction term ($\beta_3 > 0$), indicating that the existence of a mandatory RPS offsets the negative effect of high

environmental policy uncertainty on green investment decisions. Alternatively, the flexibility in meeting the state's RPS may result in β_3 not being significantly different from zero. As with equation (1), all inferences hold for alternative estimation approaches.

Table 3 provides the results from estimating equation (2). In column (1) where we omit the level of state policy uncertainty from the model, we find that the estimated coefficient on *RPS* is positive, but not significant. In the alternative estimation approaches, the estimated coefficient on *RPS* is significantly positive, suggesting that the existence of a mandatory RPS in a state increases the firm's number of renewable plants within that state in the following two years. This result is consistent with the intention of RPS to increase firms' actual green investment decisions. However, that positive association between RPS and the number of renewable plants is isolated in states with high state policy uncertainty. In columns (2) through (4), as well as in the alternative estimation approaches, the estimated coefficient on *RPS* is not significantly different from zero, indicating that the decision to purchase or construct an in-state renewable plant is unaffected by the existence of a mandatory RPS once we consider the level of state environmental policy uncertainty. When we examine the number of plants the firm announces that it intends to place at least one renewable energy generator in the future (columns (5) – (8)), we find no significant association between *RPS* and *#NewGreenAnnounceCt*, regardless of whether *HighEnvPolicyUncert* is included in the model.

We find that the estimated coefficient on *HighEnvPolicyUncert* is negative and significant for *#NewGreenPlants* (columns (2) – (4)) and *#NewGreenAnnounceCt* (columns (6) – (8)), suggesting that high state policy uncertainty reduces the number of actual and forecasted new renewable plants in states without RPS. The coefficient on the interaction term, *HighEnvPolicyUncert * RPS*, is positive but not significant. The sum of *HighEnvPolicyUncert*

*and HighEnvPolicyUncert * RPS* is insignificant in five of the six columns, consistent with high state environmental policy uncertainty not affecting firms' new green investment decisions when they are subject to mandatory RPS. This result suggests that current environmental standards at the local level may serve as a signal about whether and how future environmental policies will change. It also highlights the role in current standards mitigating the negative association between uncertainty about ongoing policy developments and firms' investment decisions.

4.3 Cross-Sectional Variation in New Green Investment with Consumer Preferences

In this subsection, we investigate whether market forces moderate any effects of policy uncertainty to promote green investing by electric utility companies. In theory, firms are incentivized to meet consumer preferences and demands. When there are strong consumer preferences for a particular product or service, meeting this demand can lead to higher revenue and greater customer satisfaction. In our context, we focus on consumer preferences for green energy policies and predict that strong consumer preferences for green energy policies attenuates the negative effect of state environmental policy uncertainty on future green investing.

To investigate the moderating role of consumer preferences for green energy policies, we construct a state-level measure based on survey responses from Yale University's Climate Opinion Survey (Howe et al. 2015). The Climate Opinion Survey provides data from more than 28,000 respondents on public opinion regarding climate change issues from 2014 through 2020. For each state, we identify survey responses to questions regarding climate change and renewable energy.[25] Using these survey responses, we create a state-level measure of consumers' green energy policy preferences, *HighPref*, an indicator variable that equals one if responses supporting green energy policies from a state are greater than or equal to the responses from the

[25] We utilize five survey questions to construct our consumer demand measure. These five questions and the states we deem as having high consumer preferences are listed in Appendix B.

median state.[26] We find that 55% of our firm-state-year observations belong to states with high consumer preferences (results not tabulated).

To test the effect of consumer preferences on the association between state environmental policy uncertainty and future green investment, we estimate the following Poisson model:

$$GreenInvesting_{i,s,t} = \beta_1 HighEnvPolicyUncert_{s,t} + \beta_2 HighPref_s + \beta_3 HighEnvPolicyUncert_{s,t} * HighPref_s + Controls_{i,t} + Year_{FE} + \varepsilon \quad (3)$$

If a state's consumer preferences for green energy policies encourages firms to invest in green assets even when there is high policy uncertainty, we should observe a positive coefficient on the interaction between *HighEnvPolicyUncert* and *HighPref* ($\beta_3 > 0$). Alternatively, because electric utility companies operate in highly regulated markets where it is difficult, if not impossible, for consumers to switch electric utility providers, firms may not respond to consumer preferences for green energy policies, resulting in an insignificant coefficient on the interaction term.

Table 4 provides the results from estimating equation (3). When we focus only on the effect of strong consumer preferences for green investment, we find that the estimated coefficient on *HighPref* is positive and significant (two-tailed $p < 0.01$) in both columns (1) and (5). These findings indicate that, on average, firms are more likely to expand their green investments when consumers demand green energy policies. When we include state environmental policy uncertainty in the model, we find that the estimated coefficient on *HighEnvPolicyUncert* is negative and significant (two-tailed $p < 0.01$) in all columns. This result indicates that in states with low consumer demand for green energy policies, high state policy uncertainty is associated with lower actual and expected future green investment. Consistent with our predictions, the estimated coefficient on the interaction between *HighEnvPolicyUncert* and *HighPref* is positive

[26] There is virtually no time-series variation across the survey years in states classified as having higher support for green energy, leading *HighPref* to be a state-level, time-invariant variable. Given this lack of time-series variation across the survey years (2014-2020), we apply our measure to the pre-survey years in our sample (i.e. 2011-2013).

and significant (two-tailed $p < 0.01$) in all six columns. We find no evidence that the sum of the coefficients on *HighEnvPolicyUncert* and *HighEnvPolicyUncert * HighPref* is different from zero in any of our six specifications. Together, these findings indicate strong consumer demand for green energy policies mitigates the negative effect of high state policy uncertainty on future green investment. One explanation for these results is that firms anticipate consumer preferences for green energy will translate into pro-environmental policies in the state as environmental policy uncertainty is resolved. As a result, firms make investments now to expand their capacity for green energy in anticipation of stronger green policies in the future. Our findings also suggest that strong consumer preferences can offset the negative effect of policy uncertainty on firms' investment decisions even in industries where consumers have limited choice in their purchasing decisions.

4.4. The Effect of Resolution of Policy Uncertainty on New Green Investment

Our results so far indicate that high state environmental policy uncertainty is negatively associated with firms' green investment decisions overall and in particular when states lack a mandatory RPS or when consumer preferences for green energy policies are low. If firms delay green investment decisions when state environmental policy uncertainty is high, as our results suggest, then we expect that firms will invest in green plants when that uncertainty is resolved.

To identify when state environmental policy uncertainty relevant to utility firms is resolved, we construct two measures based on the number of bills related to new environmental policies for the electric utility industry that eventually pass in the state legislature. To construct these measures, we collect data on state-level bills from PluralPolicy.com, which allows users to track bills, review legislation, and observe the voting patterns of state legislators.[27] This website

[27] The state-level bill data used to construct this measure was formerly maintained by OpenStates.org. In July 2023 the bill data was transferred to PluralPolicy.com.

maintains a dataset of all bills that were introduced in at least one state-level congressional chamber. From this website, we download all bills introduced from 2011 to 2018 across all 50 states.[28] We retain bills that are ultimately passed and contain references to "climate", "electric", "energy", "power", "renewable", "utility", or "utilities". We review the list of bills generated from these keywords and eliminate any bills that are unrelated to regulating the electric utility industry.[29] This process yields 1,704 bills. Next, we manually read each bill title and summary to ensure that the bill pertains to issues impacting electric utility companies, resulting in 920 bills. These bills generally cover one or more of the following topics: electric fees or rate increases, nomination of new commissioners, operator or investor rate of returns on new plants, and the adoption of a net zero commitment, or climate change. Appendix C provides examples of bills for each of these topics.

Our first measure of the resolution of state policy uncertainty, *LnBillPassCt*, is the natural log of one plus the number of environmental bills under consideration that eventually pass at the state-year level. Our second measure, *LnContrBillPass*, is the natural log of one plus the number of controversial environmental bills under consideration that eventually pass at the state-year level. We identify controversial bills as those for which the debate period, defined as the number of calendar days between the date of the bill's introduction and the date the bill is passed, is greater than the bottom quartile of the distribution of our sample (Christensen et al. 2023).[30]

[28] Data availability varies through time across states with increasing coverage over time. For example, in 2010 data on bills are only available for California, Illinois, and North Carolina. From 2017 onward, bill data are available for all 50 states.

[29] We use the following phrases to identify bills that are unrelated to issues impacting the utility industry: "Commend", "Congratulat", "Electric bicycle", "Electric bike", "Electric low-speed", "Electric motor", "Electric scooter", "Electrician", "Employee", "Empowerment", "Energy drink", "Ethanol", "Honor", "Housing", "Income", "Low", "Manpower", "Outage", "Power att", "Power of", "Power over", "Power to set", "Powers", "Recognize", "Renewable fuel", "Right of way", "Right-of-way", "Single bill", "Underground", and "Utility lien".

[30] In untabulated analyses, we confirm the results of the controversial bills analyses are robust to categorizing "controversial" using an indicator variable for above the median number of debate days.

Appendix D summarizes the average level of bills under consideration and the number of years we have bill data for each state. Although *LnBillPassCt* and *LnContrBillPass* are direct measures of the resolution of state-level environmental policy uncertainty relevant to electric utility companies, using this measure significantly reduces the power of our tests due to the availability of state-level bill data. As shown in Panel A of Table 5, the mean (median) of *LnBillCt* is 1.62 (1.61), corresponding to a mean (median) of 4.05 (4.00) environmental bills under consideration and passed in a year. The mean (median) of *LnContrBillPass* is 1.21 (1.10), corresponding to a mean (median) of 2.35 (2.00) controversial environmental bills being introduced and passed in a year.

To assess the association between firms' green investment decisions and the resolution of state policy uncertainty, we re-estimate equation (1) replacing *HighEnvPolicyUncert* with either *LnBillPassCt* or *LnContrBillPass*. Panels B and C of Table 5 provide the results for this analysis. Regardless of the measure of green investment decisions used, the estimated coefficients on *LnBillPassCt* are positive and significant in Panel B (two-tailed $p < 0.05$); the estimated coefficient on *LnContrBillPass* in Panel C is positive and significant in five of the six columns. Thus, as more environmental bills are passed, we observe an increase in the number of green plants in the subsequent two years as well as announcements of plants with future renewable energy generators. In conjunction with the previous results, these findings are consistent with firms, in the absence of a mandatory RPS or strong consumer preferences for green energy, delaying green investment until state policy uncertainty is resolved.

5. Environmental Policy Uncertainty and Operational Decisions and Fossil Fuel Plant Disposals

In this section, we investigate the relation between environmental policy uncertainty and firms' decisions regarding operations and divestment of existing assets. Our analyses to date followed the approach in prior literature and focused on firms' actual or forecasted decisions to build or acquire new green plants. While firms can become greener by increasing their renewable energy portfolio (as captured by *#NewGreenPlants* and *#NewGreenAnnounceCt*), it is difficult for a firm to achieve a desirable level of renewable energy production without increasing the output from renewable plants (relative to total production) and also divesting fossil fuel plants (due to the significant quantity of electricity produced by these plants).[31] However, a sudden decrease in the amount of available electricity from divesting of a fossil fuel plant could be problematic because utility firms would suffer regulatory fines and reputational costs if they are unable to meet the demand from consumers for electricity. Thus, in the face of high state environmental policy uncertainty, firms may change operational decisions for their green plants to increase output before divesting of a fossil fuel plant. In this section, we utilize the plant-level data available for the electric utility industry to investigate how state environmental policy uncertainty affects firms' decisions related to existing assets-in-place. To our knowledge, we provide the first evidence on the association between policy uncertainty and firms' operating decisions.

5.1. Policy Uncertainty and Operational Decisions

If firms hedge high state policy uncertainty by considering both operational and investment decisions, we expect firms will utilize their existing investments more intensively by

[31] The percentage of renewable electricity generated ("renewable energy capacity") is a common ratio utilized in states' Renewable Portfolio Standards.

increasing the relative electricity output of their renewable plants. To investigate this possibility, we construct a variable, *PctRenewableGeneration*, as the percentage of a firm's energy output within a state in year *t* that comes from renewable plants. Data on actual output comes from EIA Form 923. As shown in Panel A of Table 6, the mean (median) of *PctRenewableGeneration* in this subsample is 0.43 (0.05), indicating that significant variation exists in the usage of renewable power plants.

Panel B of Table 6 provides the results for the association between *PctRenewableGeneration* and *HighEnvPolicyUncert*. In columns (1) and (2), we estimate the OLS version of equation (1) using *PctRenewableGeneration* as the dependent variable and including an additional control variable for the number of renewable plants the firm owns in state *s* (*RenewablePlantCt*). We find that the estimated coefficient on *HighEnvPolicyUncert* is positive and significant in these estimations, indicating that in the presence of high state environmental policy uncertainty, firms increase their relative usage of renewable power plants, on average. Coupled with the findings in Table 3, these results suggest that while high environmental policy uncertainty leads firms to avoid making green investments, they instead operate their existing green investments more aggressively.

We also document a positive coefficient on *RPS* in columns (3) through (5) that is statistically significant in two of the three columns, which, as expected, provides evidence that firms who are required to produce a certain level of electricity from renewable assets have greater electricity generation, on average, from renewable plants. Consistent with columns (1) and (2), we continue to find a positive coefficient on *HighEnvPolicyUncert*. However, the coefficient on the interaction of *HighEnvPolicyUncert*RPS* is not significant, suggesting that renewable portfolio standards do not affect the relation between renewable plant output and high

environmental policy uncertainty. This lack of a moderating effect is not surprising since certain production levels are required from renewable plants to comply with RPS mandates.

In columns (7) and (8), we examine whether the existence of high consumer preferences affects the relation between *PctRenewableGeneration* and *HighEnvPolicyUncert.* While the estimated coefficient on *HighPref* is not significant, the estimated coefficient on *HighEnvPolicyUncert*HighPref* is positive and significant. Thus, firms operating in states with strong consumer preferences for green energy increase their output from renewable power plants when facing high state environmental policy uncertainty. Coupled with Table 4, the result is consistent with firms responding to strong consumer preferences for green energy by shifting output to their renewable plants rather than expanding their green investments when state environmental policy uncertainty is high. Together, these results suggest that high state environmental policy uncertainty plays a significant role in firms' operational decisions regarding how much energy to generate from renewable plants.

5.2. Policy Uncertainty and Existing Investments

In this subsection, we examine the relation between high environmental policy uncertainty and firms' decisions to reduce existing investments through fossil fuel plant divestitures, and how this relation varies with a mandatory RPS and consumer preferences. To measure divestiture decisions, we restrict our sample to observations with at least one fossil fuel plant (1,544 firm-state-years) and construct an indicator variable, *FossilFuelDisposal*, which is equal to one if a firm disposes of a nonrenewable plant and zero otherwise in the subsequent two years. *FossilFuelDisposal* captures both sales and retirements of fossil fuel plants. Again, due to the highly regulated nature of utility plant sales, we measure *FossilFuelDisposal* over the same two-year window as *#NewGreenPlants*. As shown in Panel A of Table 7, the mean of

FossilFuelDisposal is 0.23, indicating that 23% of our firm-state-year observations dispose of a nonrenewable plant over a two-year window.

Panel B of Table 7 provides the results from estimating linear probability versions of equations (1) through (3) using *FossilFuelDisposal* as the dependent variable.[32] We find that the estimated coefficient on *HighEnvPolicyUncert* is negative and significant (two-tailed $p < 0.01$) in equation (1), regardless of whether year fixed effects are included in the estimation (columns (1) and (2)). Thus, a change from low to high state environmental policy uncertainty in year *t* is associated with a reduced likelihood of disposing of a fossil fuel plant in year *t+1* or year *t+2*. The estimated coefficient in column (2) suggests that the likelihood of a fossil fuel plant disposal in the subsequent two years decreases by 9.1% when state environmental policy uncertainty changes from low to high. Relative to the unconditional mean of *FossilFuelDisposal* in Panel B of Table 7 (0.23), this represents a 40% reduction in the likelihood that a firm disposes of a fossil fuel plant in that state in the subsequent two years when faced with high state environmental policy uncertainty.

By contrast, the impact of RPS on a firm's decision to dispose of a fossil fuel plant is negligible. Regardless of whether we include state environmental policy uncertainty in the model (columns (3) and (4)), the estimated coefficient on *RPS* is insignificant, indicating that the existence of RPS within the state has no effect, on average, on *FossilFuelDisposal*. When we include our state uncertainty variable in the model (columns (4) and (5)), we find a negative but insignificant association between *FossilFuelDisposal* and *HighEnvPolicyUncert*. While the estimated coefficient on *HighEnvPolicyUncert * RPS* is insignificant negative in columns (3) and (4), the sum of *HighEnvPolicyUncert* and *HighEnvPolicyUncert * RPS* is significantly less

[32] The results are robust to using a logistic regression model for Table 7.

from zero (two-tailed $p < 0.05$). Thus, the negative association between high state environmental policy uncertainty and the likelihood the firm disposes of a fossil fuel plant is concentrated in states with a mandatory RPS.

Similarly, high consumer preferences for green energy have no effect on a firm's decision to dispose of a fossil fuel plant; regardless of whether we include state environmental policy uncertainty in the model (columns (6) – (8)), the estimated coefficient on *HighPref* is insignificant. When we include *HighEnvPolicyUncert* in the estimation (columns (7) and (8)), we find a negative and significant coefficient on *HighEnvPolicyUncert* (two-tailed $p < 0.05$). The estimated coefficient on *HighEnvPolicyUncert * HighPref* is insignificant in columns (7) and (8). The sum of *HighEnvPolicyUncert* and *HighEnvPolicyUncert * HighPref* is significantly negative in both columns (two-tailed $p < 0.10$), indicating that strong consumer demand for green energy policies does not mitigate the negative effect of high state environmental policy uncertainty on fossil fuel disposal decisions.

6. Robustness Analysis

In this section, we examine whether our main results for firms' green investment decisions hold when we use measures based on gubernatorial elections to capture state policy uncertainty.[33] The first, *ElectionYear*, is an indicator variable that equals one if the state holds a gubernatorial election in that year, zero otherwise (see Jens 2017). As shown in Panel A of Table 8, the mean value of *ElectionYear* indicates that 27% of our firm-state-year observations correspond to election years, virtually identical to the mean value of 26.2% reported in Jens (2017). As expected, we find a positive and significant correlation between *ElectionYear* and

[33] We thank Candace Jens for providing data on gubernatorial elections.

HighEnvPolicyUncert (0.0886, two-tailed $p < 0.01$, not tabulated), although the magnitude is modest. One possibility for the low correlation is that while conceptually appealing for its simplicity, *ElectionYear* assumes that the mere existence of an election indicates high levels of policy uncertainty. To capture the heightened uncertainty associated with elections where there may be a change in the party affiliation of the governor, we consider a second measure, *HistElectionFlip,* that can be measured as of the start of year *t* and is not based on the actual election outcome. *HistElectionFlip* is an indicator variable that equals to one if there is both a gubernatorial election in that year and if the party affiliation of the elected governor switched in at least one of the prior three elections. As shown in Panel A, 19% of our sample observations correspond to an election year where the state has a history of electing governors from different political parties. The correlation between *ElectionYear* and *HistElectionFlip* is 0.7927 ($p < 0.01$, not tabulated), suggesting that the two measures capture similar, but not identical, underlying constructs.

Panel B of Table 8 provides the results from estimating equation (1) when we replace *HighEnvPolicyUncert* with *ElectionYear*. When we use *#NewGreenPlants* as the dependent variable (columns (1)-(3)), the estimated coefficient on *ElectionYear* is negative but only significantly different from zero at $p < 0.01$ when we include firm and year fixed effects (column (3)). As discussed in Section 3, this measure of new green investments requires us to specify a window (the subsequent two years) over which to calculate the number of renewable plants that began operations in which the firm has an ownership interest. When examining *#NewGreenAnnounceCt*, we find that the estimated coefficient on *ElectionYear* is negative and significant in columns (5) and (6).

Panel C provides the results from estimating equation (1) after replacing *HighEnvPolicyUncert* with *HistElectionFlip*. The results largely mirror those in Panel B. Thus, the heightened policy uncertainty in election years is associated with reduced planned investment in renewable plants, consistent with inferences in Section 4. The robustness of our results to election-based measures of uncertainty mitigates the concern that our primary findings are attributable to macroeconomic factors rather than high environmental policy uncertainty.

7. Conclusions

This study provides evidence on the effect of state-level environmental policy uncertainty on firms' investment and operational decisions. Focusing on the electric utility industry where plant-level data is available, we document that high state-level environmental policy uncertainty is associated with a reduced likelihood of the number of new green plants in the subsequent two years. Consistent with this result, we also find that high state-level environmental policy uncertainty is associated with a shift of electricity output to renewable plants but a reduced likelihood of disposing a fossil fuel plant in the subsequent two years. When the state-level environmental policy uncertainty is resolved, we find an increase in firms' green investment decisions in the following two years.

We also investigate the role of current regulations and market forces in shaping the effect of environmental policy uncertainty on investment and operational decisions. Our results suggest that current regulations can provide firms with a signal of likely future policy developments, thereby reducing the negative effect of high environmental policy uncertainty on green investments. Further, strong consumer demand for green energy policies mitigates the negative effect of high state policy uncertainty on future new green investment and encourages increased

output from renewable plants. These results highlight the importance of state-level regulations and market forces in mitigating the effect of policy uncertainty on firms' investment and operating decisions. Our findings suggest that strong consumer preferences can encourage firms to make investments in environmentally responsible activities even without regulation. Finally, we provide evidence on how firms use a mix of both operational and investment decisions to hedge policy uncertainty.

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Appendix A
Variable Definitions

Variable	Definition	Data Source
ElectionYear	An indicator variable equal to one if a gubernatorial election occurs in state *s* in year *t*, 0 otherwise.	Jens (2017)
FossilFuelDisposal	An indicator variable equal to one if firm *i* disposes of a non-renewable plant in state *s* over years *t+1* and *t+2*, zero otherwise.	EIA Form 923 and Form 10-K
HighEnvPolicyUncert	An indicator variable equal to one if in year *t* state *s* has an environmental policy uncertainty index value in the top quartile, and zero otherwise.	
HighPref	An indicator variable equal to one if state *s* has an aggregate score on five questions from the Yale University's Climate Opinion Survey (see Appendix B) greater than the median score, zero otherwise.	Yale University's Climate Opinion Survey
HistElectionFlip	An indicator variable equal to one if a gubernatorial election occurs in state *s* in year *t* and if the political party affiliation of the elected governor changed in at least one of the three prior state elections, 0 otherwise.	
#NewGreenAnnounceCt	The number of plants where a new green generator to be installed at a future date was announced in state *s* during year *t* in which firm *i* has an ownership interest.	EIA Form 860 and Form 10-K
#NewGreenPlants	The number of renewable plants that began operations in years *t+1* and *t+2* in state *s* in which firm *i* has an ownership interest.	EIA Form 923 and Form 10-K
LnBillPassCt	The natural log of one plus the number of electric utility bills that passed in state *s* during year *t*.	PluralPolicy

Appendix A, Cont.
Variable Definitions

Variable	Definition	Data Source
LnContrBillPass	The natural log of one plus the number of electric utility controversial bills passed in state *s* during year *t*. Controversial bills are defined as bills whose debate days, number of days between introduction and passage, is greater than the 25th percentile of debate days.	PluralPolicy
LnSize	The natural log of the market capitalization of firm *i* as of the beginning of year *t*.	Compustat
OCF	Firm *i*'s operating cash flow for year *t-1* divided by average total assets for year *t-1*.	Compustat
PctRenewableGeneration	The total actual electricity generated by renewable plants owned by firm *i* in state *s* for year *t*, scaled by the total amount of energy generated by renewable and fossil fuel plants owned by firm *i* in state *s* for year *t*	EIA Form 923
Q	Firm *i*'s Tobin's Q ratio, calculated as the sum of firm *i*'s market value of equity and book value of debt as of the beginning of year *t* divided by the book value of assets as of the beginning of year *t*.	Compustat
RenewablePlantCt	The natural log of one plus the number of renewable plants owned by firm *i* in state *s* in year *t*.	EIA Form 923 and Form 10-K
RPS	An indicator variable equal to one if state *s* has a mandatory Renewable Portfolio Standard, zero otherwise.	
SalesGrowth	The percentage change in firm *i's* sales revenue from year *t-2* to year *t-1*.	Compustat
TangAssets	Firm *i*'s tangible assets as of the beginning of year *t* divided by total assets as of the beginning of year *t*.	Compustat

Appendix B
Consumer Preferences for Green Policies

Panel A: Survey Responses to Construct *HighPref*

1) Estimated percentage who think global warming will harm them personally a moderate amount/a great deal
2) Estimated percentage who somewhat/strongly support funding research into renewable energy sources
3) Estimated percentage who somewhat/strongly support regulating CO2 as a pollutant
4) Estimated percentage who somewhat/strongly support setting strict limits on existing coal-fire power plants
5) Estimated percentage who somewhat/strongly support requiring utilities to produce 20% electricity from renewable sources

Panel B: States with High Consumer Preferences for Green Policies

California	Maryland	New York
Colorado	Michigan	Oregon
Connecticut	Minnesota	Pennsylvania
Delaware	North Carolina	Rhode Island
Florida	New Hampshire	Virginia
Hawaii	New Jersey	Vermont
Illinois	New Mexico	Washington
Massachusetts	Nevada	Wisconsin

Appendix C
Examples of Bills Impacting the Electric Utility Industry

(1) Electric Fees or Rate Increase Hearing

AB-1710 Electrical corporations: rates.
Existing law vests the Public Utilities Commission with regulatory authority over public utilities, including electrical corporations. Existing law authorizes the commission to fix the rates and charges for every public utility and requires that those rates and charges be just and reasonable.
This bill would prohibit an electrical corporation from proposing a rate increase above the rate of inflation, as specified, except with the-approval of the commission. The bill would authorize the commission to approve a rate increase above the rate of inflation if the commission determines that those costs are directly related to safety enhancements and modernization, or higher commodity or fuel costs.
Under existing law, a violation of the Public Utilities Act or any order, decision, rule, direction, demand, or requirement of the commission is a crime.

Source: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB1710

(2) Nomination of New Commissioners

House Joint Resolution No. 373
Resolved by this Assembly:
That the nomination by His Excellency, the Governor, of John W. Betkoski III of Beacon Falls to be reappointed a utility commissioner of the Public Utility Regulatory Authority, to serve a term ending June 30, 2023, or until a successor is appointed and has qualified, whichever is longer, is approved and confirmed, and he is reappointed said utility 6 commissioner for said term.

Source: https://www.cga.ct.gov/2021/TOB/H/PDF/2021HJ-00373-R00-HB.PDF

(3) Operator Investor Rate of Returns

SB 998 Electric utilities; offshore wind development.
Electric utilities; offshore wind development. Provides that the construction or purchase by a public utility of one or more offshore wind generation facilities located off the Commonwealth's Atlantic shoreline or in federal waters and interconnected directly into the Commonwealth, with an aggregate capacity of up to 5,200 megawatts, is in the public interest. The measure provides that construction by Dominion Energy Virginia of one or more new utility-owned and utility-operated generating facilities utilizing energy derived from offshore wind and located off the Commonwealth's Atlantic shoreline, with an aggregate rated capacity between 2,500 megawatts and 3,000 megawatts, along with electrical transmission or distribution facilities associated therewith for interconnection is in the public interest. The measure provides that the State Corporation Commission will determine the reasonableness and prudence of associated costs and will presume such costs to be reasonable and prudent if certain criteria are met. The measure requires the Commission to permit a portion of the nameplate capacity of any such facility, in the aggregate, to be allocated to (i) certain commercial and industrial customers or (ii) qualifying large general service customers, provided that no more than 10 percent of the offshore wind facility's capacity is allocated to qualifying large general service

customers. The measure provides that such costs shall be allocated to all customers of the utility in the Commonwealth as a non-bypassable charge, irrespective of the generation supplier of any such customer except for customers who are eligible for a Percentage of Income Payment Program, certain commercial and industrial customers, and qualifying large general service customers. The measure requires the utility to submit a plan to the Commission that includes the following considerations: (a) options for utilizing local workers; (b) the economic development benefits of the project for the Commonwealth, including capital investments and job creation; (c) consultation with the Commonwealth's Chief Workforce Development Officer, the Chief Diversity, Equity, and Inclusion Officer, and the Virginia Economic Development Partnership, on opportunities to advance the Commonwealth's workforce and economic development goals, including furtherance of apprenticeship and other workforce training programs; and (d) giving priority to the hiring, apprenticeship, and training of veterans, local workers, and workers from historically economically disadvantaged communities. The measure provides that any such project is required to include an environmental and fisheries mitigation plan submitted to the Commission for the construction and operation of such offshore wind facilities. The bill is identical to **HB 1664** and **SB 860.**

Source: https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+SB998

(4) Net Zero Commitment or Climate Change Adaptation

AN ACT to amend the public service law, in relation to establishing a program for eligible zero emissions energy systems

The People of the State of New York, represented in Senate and Assembly, do enact as follows: Section 1. The public service law is amended by adding a new section 66-s to read as follows: § 66-s. Establishment of a zero emissions energy systems program. 1. As used in this section: (a) "zero emissions energy systems" means systems, other than renewable energy systems, that generate electricity or thermal energy through the use of technologies that do not lead to a net increase in greenhouse gas emissions into the atmosphere over their full lifecycle in the process of generating electricity; (b) "renewable energy systems" shall have the meaning provided in section sixty-six-p of this article; and (c) "greenhouse gas" shall have the meaning provided in section 75-0101 of the environmental conservation law. 2. No later than one year from the effective date of this section, the commission shall establish a competitive program to attract private sector investment in a minimum of one gigawatt of installed capacity of zero emissions energy systems that use eligible technologies that the commission has determined, after notice and provision for the opportunity to comment, are technically feasible by the year two thousand thirty of providing the operating flexibility and longer-term performance that the electric grid system will require. The commission shall: (a) establish a competitive program, after notice and provision for the opportunity to comment, for the purpose of meeting the target established pursuant to subdivision two of section sixty-six-p of this article that by the year two thousand forty the statewide electrical demand system will be zero emissions; (b) commence the implementation of the program no later than two years from the effective date of this section; and (c) require that zero emissions energy systems that are installed pursuant to this section shall commence commercial operation by the year two thousand thirty.

Source: https://legislation.nysenate.gov/pdf/bills/2021/S6497

Appendix C, Cont.
Examples of Bills Impacting the Electric Utility Industry

Act No. 153 (H.688). Energy; climate change.

This act requires reductions in Vermont's greenhouse gas emissions (GHG) tied to three time periods: 2025, 2030, and 2050. This act also creates a Climate Council that is required to develop a Climate Action Plan that sets forth the proposed programs and strategies to meet these reductions and to build resilience to the impacts of climate change, requires the Agency of Natural Resources (ANR) to adopt rules consistent with the Plan, and provides for a cause of action if the Agency fails to engage in rulemaking or adopts rules that fail to achieve the required emissions reductions. Sec. 1 sets forth a suggested title for the Act, and Sec. 2 contains legislative findings. Sec. 3 amends 10 V.S.A. § 578 to require reductions in statewide greenhouse gas emissions in three stages:

- by Jan. 1, 2025: not less than 26% below 2005 emissions;
- by Jan. 1, 2030: not less than 40% below 1990 emissions; and
- by Jan. 1, 2050: not less than 80% below 1990 emissions.

Source:
https://legislature.vermont.gov/Documents/2020/Docs/ACTS/ACT153/ACT153%20Act%20Summary.pdf

Appendix D
Electric Utility Bills by State

State	Mean Bills Per Year	Years in Sample	State	Mean Bills Per Year	Years in Sample
AK	1.00	2	MT	9.33	3
AL	4.00	2	NC	3.89	9
AR	0.00	2	ND	3.00	2
AZ	2.67	3	NE	1.00	2
CA	35.78	9	NH	9.33	3
CO	6.50	2	NJ	11.00	3
CT	6.00	2	NM	1.00	2
DE	3.00	2	NV	4.33	3
FL	0.00	2	NY	10.00	2
GA	2.00	6	OH	0.50	2
HI	15.50	2	OK	3.00	2
IA	1.50	2	OR	5.00	2
ID	2.50	2	PA	2.00	2
IL	9.00	9	RI	17.00	2
IN	2.00	2	SC	2.33	3
KS	2.00	2	SD	0.50	2
KY	1.67	3	TN	11.00	2
LA	0.50	2	TX	1.00	2
MA	8.00	2	UT	5.50	2
MD	6.33	3	VA	9.00	3
ME	6.50	2	VT	2.00	2
MI	2.00	2	WA	8.00	3
MN	3.50	4	WI	1.50	2
MO	4.00	2	WV	1.00	2
MS	0.00	2	WY	2.00	2

Table 1
Sample Statistics

Panel A: Sample Selection

	Firm-Years	Firms
CRSP/COMPUSTAT data available for 2011-2018	42,166	7,042
Electric Utilities (SIC Codes 4911 or 4931)	703	101
Incorporated in US (*FIC* = "USA")	544	78
Matched Power Plant	406	63

Panel B: Descriptive Statistics

Variable	N	Mean	Std. Dev.	p25	Median	p75
#NewGreenPlants	2,459	0.42	1.35	0.00	0.00	0.00
#NewGreenAnnounceCt	2,459	0.13	0.49	0.00	0.00	0.00
HighEnvPolicyUncert	2,459	0.23	0.42	0.00	0.00	0.00
Size	2,459	9.13	1.24	8.24	9.26	10.15
OCF	2,459	0.06	0.02	0.05	0.07	0.08
SalesGrowth	2,459	0.06	0.18	-0.03	0.03	0.08
TangAssets	2,459	0.95	0.06	0.91	0.97	1.00
Q	2,459	1.15	0.15	1.06	1.13	1.24

Panel A provides the sample selection criteria and corresponding number of firm-year observations and firms represented. Panel B provides summary statistics for the main variables at the plant-year level. All variable definitions appear in Appendix A.

Table 2
Effect of State Environmental Policy Uncertainty on Green Investment Decisions

	#NewGreenPlants			*#NewGreenAnnounceCt*		
	(1)	(2)	(3)	(4)	(5)	(6)
HighEnvPolicyUncert	-0.386**	-0.356**	-0.385**	-0.205	-0.147	-0.109
	(-2.438)	(-2.082)	(-2.099)	(-1.433)	(-0.944)	(-0.662)
LnSize	0.292***	0.275***	-0.281	0.348***	0.340***	-0.560
	(2.968)	(2.792)	(-0.392)	(3.291)	(3.269)	(-1.127)
OCF	8.643	10.913	2.022	10.826	11.333	-0.293
	(1.322)	(1.586)	(0.379)	(1.497)	(1.532)	(-0.036)
SalesGrowth	0.927*	0.483	0.170	-0.056	-0.254	-0.148
	(1.724)	(0.963)	(0.491)	(-0.134)	(-0.578)	(-0.222)
TangAssets	-4.290**	-4.728**	-2.730	-2.730	-3.258	-0.604
	(-1.973)	(-2.330)	(-0.949)	(-1.178)	(-1.488)	(-0.127)
Q	0.791	0.412	1.140	0.971	1.033	3.259**
	(1.142)	(0.551)	(0.747)	(1.395)	(1.395)	(2.304)
Fixed Effects	None	Year	Firm & Year	None	Year	Firm & Year
Observations	2,459	2,459	2,108	2,459	2,459	1,945
Pseudo R-Squared	0.0446	0.0574	0.1490	0.0415	0.0577	0.1070

This table provides the results from estimating equation (1) using either *#NewGreenPlants* (columns (1) - (3)) or *#NewGreenAnnounceCt* (columns (4) - (6)) as the dependent variable. The Poisson model is estimated with the adjustment for high dimensional fixed effects from Cohn et al. (2022). All variable definitions appear in Appendix A. Robust z-statistics based on standard errors clustered at the firm level are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3
Cross Sectional Variation in the Effect of State Environmental Policy Uncertainty on Green Investment Decisions with Mandatory RPS

	#NewGreenPlants				*#NewGreenAnnounceCt*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighEnvPolicyUncert		-0.558**	-0.542*	-0.647**		-0.552**	-0.491*	-0.515*
		(-1.985)	(-1.851)	(-2.118)		(-2.002)	(-1.769)	(-1.898)
RPS	0.376	0.321	0.329	0.146	0.281	0.186	0.196	-0.002
	(1.526)	(1.491)	(1.501)	(0.716)	(1.130)	(0.701)	(0.728)	(-0.008)
*HighEnvPolicyUncert * RPS*		0.246	0.271	0.376		0.472	0.471	0.560
		(0.829)	(0.891)	(1.217)		(1.243)	(1.281)	(1.439)
LnSize	0.305***	0.294***	0.276***	-0.295	0.355***	0.348***	0.340***	-0.580
	(3.127)	(2.988)	(2.815)	(-0.415)	(3.279)	(3.223)	(3.218)	(-1.170)
OCF	8.430	8.439	10.760	1.928	10.705	10.593	11.183	-0.228
	(1.268)	(1.275)	(1.555)	(0.365)	(1.473)	(1.466)	(1.514)	(-0.028)
SalesGrowth	0.905*	0.902*	0.443	0.215	-0.074	-0.056	-0.261	-0.107
	(1.651)	(1.677)	(0.900)	(0.601)	(-0.179)	(-0.139)	(-0.602)	(-0.157)
TangAssets	-4.309**	-4.464**	-4.947**	-2.444	-2.801	-2.837	-3.388	-0.476
	(-1.996)	(-2.039)	(-2.442)	(-0.834)	(-1.217)	(-1.222)	(-1.554)	(-0.099)
Q	0.816	0.906	0.532	1.104	1.013	1.057	1.116	3.191**
	(1.127)	(1.310)	(0.726)	(0.724)	(1.432)	(1.510)	(1.503)	(2.247)
χ^2 Statistic: *HighEnvPolicyUncert* + *HighEnvPolicyUncert * RPS* = 0		3.43*	2.20	1.95		0.19	0.01	0.04
Fixed Effects	None	None	Year	Firm & Year	None	None	Year	Firm & Year
Observations	2,459	2,459	2,459	2,108	2,459	2,459	2,459	1,945
Pseudo R-Squared	0.0454	0.0497	0.0629	0.1510	0.0428	0.0447	0.0611	0.1080

This table provides the results from estimating equation (2) using either *#NewGreenPlants* (columns (1) - (4)) or *#NewGreenAnnounceCt* (columns (5) - (8)) as the dependent variable. The Poisson model is estimated with the adjustment for high dimensional fixed effects from Cohn et al. (2022). All variable definitions appear in Appendix A. Robust z-statistics based on standard errors clustered at the firm level are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Cross Sectional Variation in the Effect of State Environmental Policy Uncertainty on Green Investment Decisions with Consumer Green Preferences

	#NewGreenPlants				*#NewGreenAnnounceCt*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighEnvPolicyUncert		-1.092***	-1.070***	-1.101***		-1.543***	-1.507***	-1.477***
		(-3.971)	(-3.872)	(-4.089)		(-2.773)	(-2.725)	(-2.750)
HighPref	0.827***	0.713***	0.720***	0.577**	0.783***	0.574**	0.569**	0.436*
	(3.740)	(3.152)	(3.078)	(2.518)	(3.803)	(2.571)	(2.532)	(1.904)
*HighEnvPolicyUncert * HighPref*		0.869***	0.890***	0.911***		1.608***	1.666***	1.690***
		(3.071)	(3.024)	(3.325)		(2.799)	(2.967)	(3.227)
LnSize	0.301***	0.287***	0.265***	-0.299	0.349***	0.334***	0.322***	-0.623
	(3.031)	(2.896)	(2.721)	(-0.428)	(3.085)	(3.013)	(3.022)	(-1.291)
OCF	9.506	9.544	11.935*	1.792	11.471	11.514	12.236*	-0.268
	(1.438)	(1.445)	(1.735)	(0.341)	(1.604)	(1.619)	(1.688)	(-0.033)
SalesGrowth	0.944*	0.935*	0.452	0.317	-0.010	-0.008	-0.252	0.054
	(1.737)	(1.756)	(0.929)	(0.894)	(-0.023)	(-0.021)	(-0.589)	(0.077)
TangAssets	-4.334**	-4.506**	-5.000**	-2.135	-2.830	-2.889	-3.570	-0.010
	(-2.000)	(-2.046)	(-2.464)	(-0.757)	(-1.203)	(-1.224)	(-1.618)	(-0.002)
Q	0.700	0.807	0.423	1.058	0.923	0.991	1.065	3.107**
	(1.017)	(1.222)	(0.598)	(0.704)	(1.338)	(1.415)	(1.429)	(2.247)
χ^2 Statistic: *HighEnvPolicyUncert* + *HighEnvPolicyUncert * HighPref* = 0		1.57	0.74	0.76		0.18	0.83	1.30
Fixed Effects	None	None	Year	Firm & Year	None	None	Year	Firm & Year
Observations	2,459	2,459	2,459	2,108	2,459	2,459	2,459	1,945
Pseudo R-Squared	0.0685	0.0762	0.0898	0.1700	0.0605	0.0692	0.0862	0.1280

This table provides the results from estimating equation (3) using either *#NewGreenPlants* (columns (1) - (4)) or *#NewGreenAnnounceCt* (columns (5) - (8)) as the dependent variable. The Poisson model is estimated with the adjustment for high dimensional fixed effects from Cohn et al. (2022). All variable definitions appear in Appendix A. Robust z-statistics based on standard errors clustered at the firm level are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5
Effect of Resolution of State Environmental Policy Uncertainty on Green Investment Decisions

Panel A: Bill Count Descriptive Statistics

Variable	N	Mean	Std. Dev.	p25	Median	P75
LnBillPassCt	902	1.62	1.16	0.69	1.61	2.40
LnContrBillPass	902	1.21	1.25	0.00	1.10	2.08

Panel B: Effect of Bill Count on Green Investment Decisions

	#NewGreenPlants			*#NewGreenAnnounceCt*		
	(1)	(2)	(3)	(4)	(5)	(6)
LnBillPassCt	0.384***	0.214**	0.265***	0.375***	0.231**	0.266**
	(4.234)	(1.980)	(2.617)	(3.106)	(2.015)	(2.260)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	None	Year	Firm & Year	None	Year	Firm & Year
Observations	902	902	771	902	902	642
Pseudo R-Squared	0.0748	0.1280	0.2590	0.0704	0.1250	0.1700

Panel C: Effect of Controversial Bill Count on Green Investment Decisions

	#NewGreenPlants			*#NewGreenAnnounceCt*		
	(1)	(2)	(3)	(4)	(5)	(6)
LnContrBillPass	0.295***	0.133	0.172**	0.315***	0.182**	0.212**
	(3.631)	(1.615)	(2.285)	(3.093)	(1.984)	(2.280)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	None	Year	Firm & Year	None	Year	Firm & Year
Observations	902	902	771	902	902	642
Pseudo R-Squared	0.0644	0.1240	0.2530	0.0673	0.1240	0.1690

Panel A provides descriptive statistics for the count of electric utility bills that passed, *LnBillCt,* and the count of controversial electric utility bills that passed, *LnContrBillPass*. Panel B (Panel C) presents the results from estimating equation (1) after replacing the measure of policy uncertainty with the proxy for the resolution of uncertainty based on the count of (controversial) electric utility bills that passed. In Panels B and C, the Poisson model is estimated with the adjustment for high dimensional fixed effects from Cohn et al. (2022) and the dependent variable is either *#NewGreenPlants* (columns (1) - (3) or *#NewGreenAnnounceCt* (columns (4) - (6)). All variable definitions appear in Appendix A. Robust z-statistics are based on standard errors clustered at the firm level and are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Effect of State Environmental Policy Uncertainty, Mandatory RPS, and Consumer Green Preferences on Renewable Energy Output

Panel A. Descriptive Statistics

Variable	N	Mean	Std. Dev.	p25	Median	p75
PctRenewableGeneration	2,459	0.43	0.48	0.00	0.05	1.00
RenewablePlantCt	2,459	3.28	6.96	0.00	1.00	3.00

Panel B. Effect of Policy Uncertainty, Mandatory RPS, and Consumer Green Preferences on Renewable Energy Output

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighEnvPolicyUncert	0.135***	0.106***		0.175**	0.159**		0.044	0.042
	(3.637)	(2.687)		(2.316)	(2.026)		(0.709)	(0.662)
RPS			0.084	0.105*	0.106*			
			(1.571)	(1.755)	(1.789)			
*HighEnvPolicyUncert * RPS*				-0.052	-0.071			
				(-0.688)	(-0.925)			
HighPref						0.019	-0.018	-0.004
						(0.351)	(-0.320)	(-0.077)
*HighEnvPolicyUncert * HighPref*							0.169***	0.121*
							(2.676)	(1.888)
F-Statistic: *HighEnvPolicyUncert + HighEnvPolicyUncert * RPS = 0*				13.33***	6.20**			
F-Statistic: *HighEnvPolicyUncert + HighEnvPolicyUncert * HighPref* = 0							40.64***	20.85***
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	None	Year	None	None	Year	None	None	Year
Observations	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459
Adj. R-Squared	0.0891	0.117	0.0815	0.0964	0.1240	0.0755	0.0944	0.1196

This presents the results from estimating equations (1) – (3) using *PctRenewableGeneration* as the dependent variable and including *RenewablePlantCt* as an additional control variable. All variable definitions appear in Appendix A. Robust t-statistics are based on standard errors clustered at the firm level and are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 7
Effect of State Environmental Policy Uncertainty, Mandatory RPS, and Consumer Green Preferences on Fossil Fuel Disposal Decisions

Panel A. Descriptive Statistics

Variable	N	Mean	Std. Dev.	p25	p50	p75
FossilFuelDisposal	1,544	0.23	0.42	0.00	0.00	0.00

Panel B. Effect of State Policy Uncertainty, Mandatory RPS, and Consumer Green Preferences on Fossil Fuel Disposal Decisions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighEnvPolicyUncert	-0.095***	-0.091***		-0.056	-0.048		-0.095**	-0.093**
	(-3.537)	(-3.057)		(-1.292)	(-1.089)		(-2.448)	(-2.381)
RPS			0.027	0.035	0.036			
			(0.741)	(0.829)	(0.838)			
*HighEnvPolicyUncert * RPS*				-0.059	-0.064			
				(-1.034)	(-1.060)			
HighPref						0.013	0.007	0.009
						(0.480)	(0.220)	(0.253)
*HighEnvPolicyUncert * HighPref*							0.001	0.006
							(0.021)	(0.106)
F-Statistic: *HighEnvPolicyUncert* + *HighEnvPolicyUncert * RPS* = 0				10.81***	8.14***			
F-Statistic: *HighEnvPolicyUncert* + *HighEnvPolicyUncert * HighPref* = 0							5.94**	3.95*
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	None	Year	None	None	Year	None	None	Year
Observations	1,544	1,544	1,544	1,544	1,544	1,544	1,544	1,544
Adj. R-Squared	0.0429	0.0464	0.0360	0.0429	0.0466	0.0354	0.0417	0.0453

This presents the results from estimating linear probably models from equations (1) – (3) using *FossilFuelDisposal* as the dependent variable. All variable definitions appear in Appendix A. Robust t-statistics are based on standard errors clustered at the firm level and are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Robustness Analysis: Election-Based Measures of State Policy Uncertainty

Panel A: Descriptive Statistics

Variable	N	Mean	Std. Dev.	p25	Median	P75
ElectionYear	2,459	0.27	0.44	0.00	0.00	1.00
HistElectionFlip	2,459	0.19	0.39	0.00	0.00	0.00

Panel B: Election Years and Green Investment Decisions

	#NewGreenPlants			*#NewGreenAnnounceCt*		
	(1)	(2)	(3)	(4)	(5)	(6)
ElectionYear	-0.012	-0.193	-0.270*	-0.018	-0.365**	-0.465***
	(-0.112)	(-1.526)	(-1.849)	(-0.119)	(-2.245)	(-2.625)
LnSize	0.303***	0.285***	-0.317	0.353***	0.344***	-0.583
	(3.116)	(2.930)	(-0.440)	(3.310)	(3.280)	(-1.183)
OCF	8.620	10.641	1.564	10.867	11.120	-0.623
	(1.297)	(1.552)	(0.285)	(1.472)	(1.501)	(-0.075)
SalesGrowth	0.931*	0.469	0.147	-0.060	-0.252	-0.156
	(1.710)	(0.926)	(0.427)	(-0.141)	(-0.574)	(-0.235)
TangAssets	-4.126*	-4.647**	-2.885	-2.671	-3.163	-0.626
	(-1.927)	(-2.290)	(-0.982)	(-1.166)	(-1.438)	(-0.133)
Q	0.699	0.363	1.152	0.927	1.015	3.280**
	(0.964)	(0.473)	(0.754)	(1.305)	(1.365)	(2.366)
Fixed Effects	None	Year	Firm & Year	None	Year	Firm & Year
Observations	2,459	2,459	2,108	2,459	2,459	1,945
Pseudo R-Squared	0.0404	0.0546	0.1460	0.0405	0.0594	0.1100

Panel C: Election Uncertainty and Green Investment Decisions

	#NewGreenPlants			*#NewGreenAnnounceCt*		
	(1)	(2)	(3)	(4)	(5)	(6)
HistElectionFlip	0.040	-0.078	-0.090	-0.113	-0.404*	-0.463**
	(0.293)	(-0.469)	(-0.512)	(-0.679)	(-1.957)	(-2.080)
LnSize	0.302***	0.286***	-0.311	0.355***	0.348***	-0.560
	(3.085)	(2.932)	(-0.428)	(3.306)	(3.326)	(-1.130)
OCF	8.687	10.661	1.637	10.767	11.170	-0.534
	(1.312)	(1.557)	(0.301)	(1.468)	(1.515)	(-0.065)
SalesGrowth	0.937*	0.461	0.147	-0.060	-0.289	-0.155
	(1.710)	(0.908)	(0.426)	(-0.143)	(-0.658)	(-0.233)
TangAssets	-4.096*	-4.687**	-2.896	-2.720	-3.277	-0.470
	(-1.913)	(-2.313)	(-0.983)	(-1.173)	(-1.489)	(-0.099)
Q	0.687	0.361	1.154	0.942	0.984	3.267**
	(0.945)	(0.467)	(0.751)	(1.364)	(1.322)	(2.353)
Fixed Effects	None	Year	Firm & Year	None	Year	Firm & Year
Observations	2,459	2,459	2,108	2,459	2,459	1,945
Pseudo R-Squared	0.0404	0.0540	0.1450	0.0408	0.0600	0.1100

Panel A provides descriptive statistics for the election-based measures of state policy uncertainty, *ElectionYear* and *HistElectionFlip*. Panels B and C provide the results from estimating equation (2) when *HighEnvPolicyUncert* is replaced with *ElectionYear* or *HistElectionFlip,* respectively. In Panels B and C, the Poisson model is estimated with the adjustment for high dimensional fixed effects from Cohn et al. (2022) and the dependent variable is either *#NewGreenPlants* (columns (1) - (3)) or *#NewGreenAnnounceCt* (columns (4) - (6)). All variable definitions appear in Appendix A. Robust z-statistics are based on standard errors clustered at the firm level and are reported in parentheses below the estimated coefficient. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.