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Impact of State-Specific Green Energy Policies on Renewable Energy Adoption: A Comparative Analysis of New York, California, and Texas

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Abstract

This thesis examines the renewable energy policy frameworks of New York, Texas, and California, each of which has adopted diverse and influential approaches to promoting renewable energy. By analyzing the legislative and regulatory mechanisms implemented in these states, this study uncovers the effectiveness and interplay of different policy instruments in driving renewable energy adoption. The hypothesis posited that states with a combination of stringent regulatory frameworks and substantial financial incentives would demonstrate higher rates of renewable energy adoption. Findings revealed that New York's CLCPA and CES, California's RPS and cap-and-trade program, and Texas's tax incentives and REC trading program have all significantly driven renewable energy growth, albeit through different mechanisms. These results suggest that while comprehensive policy frameworks integrating regulatory measures with financial incentives are highly effective, market-driven approaches can also yield significant renewable energy growth, particularly when supported by favorable conditions. This thesis employs Agency Theory and Institutional Theory to understand the observed policy outcomes. Through qualitative content analysis and comparative case study methodology, it identifies key themes and trends in renewable energy policy implementation, offering insights into the effectiveness of various strategies and the broader implications for state-level energy transitions. The findings contribute to the growing body of knowledge on renewable energy policy effectiveness, offering practical recommendations for policymakers aiming to enhance renewable energy adoption and support the United States' transition to a carbon-free future.

Introduction

Renewable energy policies in the United States have become a critical area of focus as states strive to reduce greenhouse gas emissions, enhance energy security, and transition to a sustainable energy system. This thesis examines the renewable energy policy frameworks of New York, Texas, and California, three states which have adopted diverse and influential approaches to promoting renewable energy. By analyzing the legislative and regulatory mechanisms implemented in these states, this study aims to uncover the effectiveness and interplay of different policy instruments in driving renewable energy adoption. New York,

California, and Texas have distinct energy landscapes and policy approaches, providing a rich comparative context for understanding how state-specific policies can impact renewable energy outcomes. New York's initial RPS, ambitious Climate Leadership and Community Protection Act (CLCPA), and its Clean Energy Standard (CES) set the stage for significant renewable energy goals, leveraging financial mechanisms and regulatory frameworks to promote substantial investment in clean energy technologies. California's Renewable Portfolio Standard (RPS), combined with its cap-and-trade program and various financial incentives, underscores the state's comprehensive strategy towards achieving 100% clean energy by 2045. Texas, with its focus on tax incentives under Chapter 313 and its REC trading program, highlights a market-driven approach that has positioned the state as a leader in wind energy generation.

The central research question guiding this thesis is: How do state-specific renewable energy policies, including financial mechanisms and regulatory frameworks, interact to influence renewable energy uptake in New York, California, and Texas? This thesis hypothesizes that states with a combination of stringent regulatory frameworks and substantial financial incentives will demonstrate higher rates of renewable energy adoption compared to states with less comprehensive policy approaches. Specifically, it is anticipated that New York and California will exhibit more significant renewable energy uptake due to their aggressive policy measures, whereas Texas, which relies more heavily on market-driven incentives, may show different outcomes in renewable energy adoption. By addressing this question, the study aims to explore the mechanisms through which different policy instruments affect renewable energy adoption and to assess the overall effectiveness of these state-specific approaches. This thesis is structured to provide a detailed exploration of the renewable energy policies in these states, followed by a theoretical framework that applies Agency Theory and Institutional Theory to understand the observed policy outcomes. Through qualitative content analysis and comparative case study methodology, this research aims to identify key themes and trends in renewable energy policy implementation, offering insights into the effectiveness of various strategies and the broader implications for state-level energy transitions. The findings from this research will contribute to the growing body of knowledge on renewable energy policy effectiveness, offering practical

recommendations for policymakers and stakeholders aiming to enhance renewable energy adoption. By understanding the successes and challenges faced by New York, California, and Texas, this thesis seeks to inform the development of more robust and adaptive renewable energy policies that can support the United States' transition to a sustainable energy future.

Literature Review

New York

The Climate Leadership and Community Protection Act (CLCPA), enacted in 2019, establishes New York as a leader in renewable energy and climate policy. The CLCPA mandates that 70% of the state's electricity come from renewable sources by 2030, with a goal of 100% green energy by 2040. It also aims to reduce greenhouse gas emissions by 85% from 1990 levels by 2050. The Climate Action Council's Scoping Plan, approved in 2022, outlines strategies to achieve these targets, addressing barriers to renewable energy deployment (Wiley, 9). Despite progress towards its goal, significant challenges remain for the its target, requiring ongoing evaluation and strategic adjustments. The Clean Energy Standard (CES), implemented by the New York Public Service Commission (PSC) in 2016, is a critical policy framework supporting New York's renewable energy goals (Hanson, 58). It targets 50% renewable electricity by 2030 and comprises the Renewable Energy Standard (RES) and the Zero-Emissions Credit (ZEC) requirement. The RES requires load-serving entities (LSEs) to procure renewable energy or purchase Renewable Energy Credits (RECs) from NYSERDA, while the ZEC supports financially distressed nuclear plants, ensuring their continued operation as a zero-emission energy source. This dual approach fosters renewable energy growth and stabilizes the nuclear sector, which is essential for maintaining low carbon emissions (Sciascia, 7).

Renewable Energy Credits (RECs) are vital to New York's renewable energy strategy. RECs, representing the environmental benefits of renewable energy, are issued for each megawatt-hour (MWh) of clean energy generated. Energy providers must purchase RECs to comply with the RES, providing a financial incentive for renewable energy projects (Hanson, 59). This enables REC markets to effectively promote renewable energy adoption but requires continuous oversight to ensure market stability and the achievement of policy objectives. The NY Green Bank, part of the Reforming the Energy Vision (REV) initiative, addresses financing

gaps in the clean energy sector. With $165.6 million in initial funding, the Green Bank offers financial products such as securitization and credit enhancements to boost private sector investment in renewable energy. Its role in overcoming market barriers and facilitating capital availability has significantly impacted renewable energy deployment in New York (Peters, 459). The New York State Energy Research and Development Authority (NYSERDA) plays a central role in advancing renewable energy. NYSERDA manages the CES, REC, and ZEC procurement, and administers programs like NY-Sun to support solar energy development.

Texas

Texas's renewable energy policies are significantly shaped by its Renewable Portfolio Standards (RPS) and Chapter 313 of its Tax Code, serving as pivotal instruments in encouraging the development of utility-scale wind and solar power (Maguire, 470). Introduced to attract new taxable property development, Chapter 313 offers value limitations on appraised property values for school district maintenance and operations taxes. This framework has been crucial for the expansion of solar energy, with a marked increase in solar project applications beginning in 2018 and a substantial surge in 2019. Solar projects under Chapter 313 have outpaced wind projects in terms of agreements, contributing nearly 15 GW to the ERCOT grid, reflecting a notable growth in installed capacity, particularly in 2021 (Cooper, 75). Despite the positive impact on solar energy expansion, the economic benefits and costs of Chapter 313 have been contentious. The Texas Comptroller's reports reveal that renewable energy projects account for a significant portion of the investments under Chapter 313, with approximately $145.7 billion projected over the lifetime of these agreements (Texas Comptroller of Public Accounts, A). However, these agreements have led to considerable state costs, with renewable energy projects alone estimated to cost $270 million annually in tax abatements (Greer, 2). The Texas Public Policy Foundation criticizes the overall efficacy and economic impact of Chapter 313, suggesting that these tax abatements may not be justified given their substantial costs and limited job creation, especially in renewable energy projects. The criticisms include concerns about the adverse effects on the electricity grid and the inefficiencies of current subsidy structures (Greer, 3). These debates highlight the complex interplay between policy incentives and their broader economic impacts,

emphasizing the need for careful evaluation and potential reform of Texas's renewable energy regulatory framework.

California

California's ambitious renewable energy policies have significantly shaped its energy landscape over the past two decades. Since the introduction of the Renewable Portfolio Standard (RPS) in 2003, California has mandated that utilities source a growing share of their electricity from renewable sources such as solar and wind power. The RPS was initially set to achieve 33% renewable energy by 2020, a target that the state has largely met through various mechanisms including Renewable Energy Credits (RECs) and investments in renewable infrastructure (Walmsley, 260). The progression of the RPS has been marked by a series of legislative and regulatory actions aimed at expanding its scope and ambition. In 2015, Governor Jerry Brown signed the Clean Energy and Pollution Reduction Act, which increased the RPS target to 50% by 2030. This ambitious goal is supported by additional policy tools such as the Renewable Auction Mechanism (RAM), Feed-in Tariffs (FIT), the California Solar Initiative (CSI), and Net Energy Metering (NEM). Each of these programs plays a critical role in promoting renewable energy deployment by providing incentives for both large-scale and distributed renewable projects. The FIT, for instance, guarantees long-term contracts for small-scale renewable generators, while the CSI aims to foster substantial growth in solar PV installations. The state's RPS, combined with these targeted policy instruments, has driven significant progress in renewable energy capacity and has contributed to a notable reduction in greenhouse gas emissions (Mormann, 91).

Despite these successes, California faces ongoing challenges in its quest for a fully renewable energy system. Senate Bill 100 (SB100), enacted in September 2018, represents a bold commitment to increasing the RPS requirement to 60% by 2030 and achieving 100% clean energy across all sectors by 2045. While this goal is technically feasible, it introduces complex challenges related to managing over-generation and ensuring grid reliability (Schulte, 32). The state's heavy reliance on intermittent renewable sources necessitates advancements in energy storage technologies to address issues of energy surplus and grid stability. Current battery technologies, though promising, face high costs and limitations in storage duration, making them

insufficient for a fully renewable grid without further technological improvements. California's Cap-and-Trade program, which sets a cap on total emissions and allows trading of emissions allowances to incentivize reductions, plays a crucial role in shaping favorable market dynamics for renewables by pricing carbon emissions and indirectly encouraging cleaner energy sources. However, criticisms of the Cap-and-Trade program include concerns about its effectiveness and the potential for oversupply of emissions allowances (Blondell, 9). The interplay between California's RPS, Cap-and-Trade, and other clean energy initiatives highlights the state's multifaceted approach to achieving its renewable energy targets, balancing ambitious goals with practical challenges and evolving market conditions

Theoretical Foundation

Agency Theory

Agency theory, at its core, revolves around the relationship between a principal and an agent, where the principal pays the agent to act on their behalf or provide some service. In these relationships, inherent challenges arise due to goal conflicts and differing risk preferences. According to Ross, agency relationships are ubiquitous, encompassing employer-employee dynamics, state-citizen interactions, and various contractual arrangements (Ross, 134). The essence of this theory is that agents are autonomous and tend to maximize their interests, often at the expense of the principals' goals (Sharma, 759). This principal-agent dynamic brings to light issues such as moral hazard, where agents may not exert the agreed-upon effort, and adverse selection, where agents misrepresent their abilities (Eisenhardt, 61). Jensen and Meckling highlight that agency relationships entail costs, including monitoring and bonding expenses, to align the agent's actions with the principal's interests. Despite these measures, it is challenging to ensure optimal decision-making from the principal's viewpoint without incurring significant costs (Jensen, 308). Wright further emphasizes that the principal's welfare may not be maximized due to differing goals and risk preferences between the principal and agent (Wright, 417). Consequently, agency theory focuses on crafting contracts that minimize these costs and mitigate the agent's self-interested behaviors. Fudenberg discusses the efficiency of various incentive schemes, such as short-term contracts like piece rates and commissions versus long-term contracts. His analysis reveals that the value of long-term contracts primarily lies in avoiding the

pitfalls of asymmetric information during recontracting phases (Fudenberg, 2). Meanwhile, Reichelstein illustrates how agency theory's principles can be applied in practical contexts, such as designing incentive contracts for government projects, demonstrating the theory's real-world applicability (Reichelstein, 713).

Institutional Theory

Institutional theory has gained prominence across the social sciences as scholars seek to understand how institutions shape collective political and economic behaviors beyond mere aggregations of individual choices. This resurgence, a reaction to the behavioral revolution, emphasizes the role of enduring social contexts and institutional structures in shaping policy outcomes and organizational behaviors (DiMaggio & Powell, 2). The theory underscores the importance of "rules of the game" such as legislation and regulation, in governing sectors like energy systems, which are undergoing significant transitions towards low-carbon energy systems (Milchram, 7). Institutions, according to Zucker, are characterized by rule-like qualities embedded in formal structures, influencing actions independently of specific actors. This embeddedness in formal structures, originating either from external coercive pressures or internal processes of imitation and normative transmission, highlights how institutions create stability and continuity within organizations while also fostering new institutional elements (Zucker, 443). Kuzemko expands on this by emphasizing that new institutionalism unifies around mediating politico-economic relations through formal and informal rules and norms, illustrating how ideas shape policies, frame political actions, and construct values (Kuzemko, 99).

Jehling's analysis of socio-technical transitions and energy transitions emphasizes institutionalism's focus on power dynamics and persistent conflicts among groups, which are crucial for crafting reform strategies. Historic institutionalism, in particular, highlights how institutions carry legacies of mixed motivational demands from past contexts, enabling the analysis of the full range of possibilities for actors' motivation (Jehling, 111). New institutionalism offers diverse approaches to understanding politics through institutions as regularized practices, emphasizing their dialectic relationships with actors and their evolution over time. DiMaggio's concept of isomorphism complements these perspectives by exploring how organizations conform to institutional pressures, leading to homogenization in structures

and practices (DiMaggio, 150). This conformity ensures legitimacy and resource access but may also stifle innovation. Young's new institutionalism further expands on these ideas by integrating collective action and social practice models to examine how governance systems and leadership shape environmental problem-solving. The collective action model is based on standard rational choice, while the social practice model emphasizes the role of culture and norms in explaining human action (Young, 29). Additionally, Young introduces the "knowledge action perspective" which stresses agency, individual leadership, and the role of governance systems in understanding environmental problems (Young, 8). The Institutional Analysis and Development (IAD) framework, particularly in its dynamic form, illustrates how institutional change is driven not just by structural and procedural factors, but also by shifts in core values within a community. Changes in values, such as the European Union's shift from market efficiency to sustainability and security of supply, have led to significant policy transformations (Milchram, 10). In addressing long-term policy issues like climate change, Finnegan argues that institutional arrangements—specifically electoral rules and interest group intermediation—play crucial roles (Finnegan, 3). Overall, institutional theory posits that institutional structures not only dictate policy outcomes in areas like taxation, trade, and social policy but also significantly influence the ability of societies to address enduring and complex challenges such as climate change.

While these studies offer valuable insights into the role of financial incentives and legislative frameworks at the state level, a noticeable gap remains in understanding the specific impacts of state-driven tax incentives on shaping renewable energy policies. This research aims to address this gap by examining the distinct historical and current policy efforts of California, Texas, and New York. By analyzing both the intended and actual impacts of corporate tax incentives and their respective legislative frameworks within each state, this study seeks to provide a deeper, more comprehensive understanding of how these incentives and regulatory frameworks interact in the broader landscape of renewable energy policy.

Theoretical Framework

I. Introduction

As we find ourselves in a critical juncture of human history, the world is more ardently gravitating toward sustainable energy alternatives. This directional shift is driven by both the effects of climate change and the societal understanding of sustainability as a moral and economic necessity. Amid this global transformation, the importance of corporate tax incentives and effective regulatory frameworks in shaping the adoption of renewable energy sources has emerged as a highly salient subject. The core of this research endeavor is underpinned by a theoretical framework specifically designed to dissect the intricate interplay between state-specific regulatory frameworks, corporate tax incentives, and the development and implementation of renewable energy policies in the United States. While the landscape of renewable energy incentives is indeed a national concern, this study zeroes in on the particularly instructive cases of California, Texas, and New York. Each of these states presents a unique set of regulatory environments and cultural contexts that make them fertile ground for in-depth study. Within the confines of this framework, corporate tax incentives are elevated beyond their traditional role as mere financial instruments. They are reconceptualized as strategic levers, wielding substantial influence over the trajectory of renewable energy adoption. These tax incentives, whether they manifest as credits, exemptions, or direct subsidies, possess the capacity to act as either catalysts or barriers to increasing renewable energy production.

II. Agency Theory

Principal-Agent Relationships

Principal-agent relationships, a core concept of Agency Theory, involve a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf. In this context, the principal delegates decision-making authority to the agent (Jensen & Meckling, 1976). In renewable energy policy, these relationships are particularly relevant as they capture the dynamic between various stakeholders, such as government bodies (principals) and private energy firms or utility companies (agents). In renewable energy policy, principal-agent relationships are crucial for understanding how governments design and

implement policies to promote renewable energy adoption. The government (principal) relies on private firms (agents) to develop and deploy renewable energy technologies. This relationship is fundamental in mechanisms like subsidies, tax incentives, and regulatory frameworks aimed at encouraging renewable energy investments. Effective principal-agent relationships can ensure that renewable energy goals are met efficiently, aligning public interest with private sector execution.

Theoretical Challenges

Information asymmetry arises when one party in the principal-agent relationship possesses more or better information than the other. In renewable energy policy, private firms often have more detailed knowledge about technological capabilities, costs, and market conditions compared to government bodies. This imbalance can lead to suboptimal policy outcomes, as the government may struggle to design incentives that accurately reflect industry realities. Addressing information asymmetry requires robust data collection, transparent reporting mechanisms, and continuous stakeholder engagement (Eisenhardt, 1989). Moral hazard occurs when the agent has incentives to take risks because the consequences are borne by the principal. In renewable energy policy, private firms might engage in riskier or less efficient projects due to government subsidies. To mitigate moral hazard, policymakers can design performance-based incentives and enforce monitoring mechanisms (Holmstrom, 1979).

Alignment of interests between principals and agents is crucial for successful renewable energy policies. Misaligned interests can lead to conflicts and inefficiencies. Effective alignment can be achieved through contracts with clear performance metrics, incentive structures rewarding long-term investments, and collaborative governance models involving all stakeholders (Ross, 1973).

These principal-agent relationships theoretically impact the implementation and effectiveness of renewable energy policies by shaping how policies are designed, enforced, and adhered to by stakeholders. For instance, information asymmetry can hinder the government's ability to create well-informed policies, while moral hazard can lead to inefficient or risky investments. Conversely, well-aligned interests can enhance policy effectiveness by ensuring that both principals and agents work towards common goals. Mechanisms such as performance-based

incentives, transparent reporting, and collaborative governance models can bridge gaps in information, mitigate risks, and align interests. These dynamics influence policy outcomes by determining how effectively renewable energy technologies are adopted, how efficiently resources are allocated, and how sustainably the energy transition is managed.

Incentive Structure

Incentive structures are crucial mechanisms used to align the interests of principals and agents by establishing performance-based rewards or penalties. These structures are designed to motivate agents to act in ways that are consistent with the goals and objectives set by the principals. In the realm of renewable energy policy, incentive structures play a pivotal role in driving the behavior of private firms, which are key players in the deployment and advancement of renewable technologies. Governments, as principals, use various forms of incentives—such as subsidies, tax credits, grants, or feed-in tariffs—to encourage private firms, utility companies, and other stakeholders to invest in and adopt renewable energy technologies (Jensen & Meckling, 1976). These incentives are intended to reduce financial barriers, stimulate innovation, and accelerate the transition to a low-carbon energy system. Effective incentive structures are designed to align the private sector's actions with public policy objectives, ensuring that investments in renewable energy are both substantial and sustainable. The importance of these structures lies in their ability to create a clear linkage between the achievement of policy goals and the rewards offered, thereby guiding private sector behavior towards desired outcomes.

Well-designed incentive structures are grounded in several theoretical principles that ensure they are effective in achieving policy goals. One key principle is the alignment of incentives with desired outcomes, which ensures that agents' actions directly contribute to the principals' objectives. For instance, performance-based incentives, which tie rewards to specific achievements such as reaching energy production targets or reducing emissions, align agents' interests with the policy goals of reducing greenhouse gas emissions and increasing renewable energy adoption. Another important principle is the minimization of information asymmetry. Incentives designed to promote transparency and accurate reporting can help bridge the information gap between principals and agents, leading to better-informed policy decisions and

more effective implementation (Eisenhardt, 1989). Additionally, incentive structures must address moral hazard by ensuring that agents are not encouraged to take excessive risks. For example, providing rewards based on long-term performance rather than short-term achievements can mitigate the risk of agents pursuing unsustainable projects for immediate gains (Holmstrom, 1979). By incorporating these principles, incentive structures can effectively drive agents towards achieving policy goals while minimizing potential inefficiencies and conflicts.

Different incentive structures theoretically affect the alignment of interests and influence policy outcomes by shaping the behaviors of agents in relation to the goals set by principals. For instance, performance-based incentives can directly link financial rewards to specific achievements, such as energy production levels or emission reductions, thus ensuring that agents' actions align with policy objectives. Conversely, poorly designed incentives may fail to address underlying issues, such as moral hazard or misaligned interests, potentially leading to inefficiencies or unintended consequences. To promote desired outcomes in renewable energy policies, incentives should be designed with clear, measurable goals, transparency in reporting, and mechanisms for ongoing adjustment based on performance feedback. Broadly, effective incentive structures facilitate the alignment of private sector actions with public policy goals, driving progress towards renewable energy targets and fostering a more sustainable energy transition.

III. Institutional Theory

Institutional Change and Value Adaptation

Institutional change refers to the transformation of established structures, rules, and norms that govern political, economic, and social interactions within a society. These changes are often driven by evolving values and priorities, which reflect the collective beliefs and preferences of a community. Value shifts, in particular, play a critical role in influencing policy development and implementation. As societal values evolve—shaped by factors such as technological advancements, environmental concerns, and economic pressures—institutions must adapt to reflect these new priorities (Dacin, 46). This adaptation process involves not only the modification of existing policies and frameworks but also the introduction of new mechanisms that better align with contemporary values. In the context of renewable energy

policy, institutional change and value shifts are evident in the ways states like New York, Texas, and California have restructured their energy systems to prioritize sustainability and greenhouse gas reduction. For example, New York's Climate Leadership and Community Protection Act (CLCPA) reflects a value shift towards aggressive climate action, mandating significant increases in renewable energy usage and emissions reductions. Similarly, Texas's Chapter 313 incentives and California's Renewable Portfolio Standard (RPS) illustrate how changing economic and environmental values can reshape policy frameworks to support renewable energy adoption.

Theoretical Implications:

Changes in values and institutional adaptation are theoretically expected to shape policies and institutional behaviors in several ways. Firstly, evolving values can lead to the redefinition of policy goals and priorities, prompting the introduction of new legislation and regulatory measures. For instance, as environmental sustainability becomes a more pressing concern, policies that favor renewable energy sources over fossil fuels gain prominence. This shift is not merely a response to technological feasibility but also a reflection of the changing societal consensus on the importance of addressing climate change. The theoretical impact of these changes on policy effectiveness and adaptability is significant. Institutions that successfully adapt to new values are better equipped to implement effective policies that meet contemporary needs (DiMaggio, 12). This adaptability enhances policy resilience, allowing for continuous improvement and responsiveness to emerging challenges. For example, the implementation of the Clean Energy Standard (CES) in New York and the adjustments made to California's RPS to include more ambitious targets demonstrate how institutional flexibility can lead to more robust and effective policy outcomes.

Moreover, institutional adaptation involves not just policy changes but also shifts in organizational behaviors and practices. Institutions that embrace new values often undergo internal transformations, adopting new processes, structures, and cultures that support the revised policy objectives (Milchram, 2019). This internal adaptation is crucial for ensuring that the new policies are effectively implemented and sustained over time. For instance, NYSERDA's role in

managing renewable energy credits (RECs) and administering programs like NY-Sun reflects an institutional commitment to supporting New York's renewable energy goals. The theoretical framework of institutional change and value shifts also highlights the potential for conflicts and resistance during the adaptation process. Institutions embedded in established norms and practices may resist change, leading to tensions and challenges in implementing new policies. Understanding these dynamics is crucial for designing strategies that facilitate smooth transitions and minimize resistance. The debates around the economic impacts of Texas's Chapter 313 incentives illustrate the complexities and controversies that can arise when long-standing policies are re-evaluated in light of new values (Greer, 3).

Normative and Coercive Pressures

Normative and coercive pressures are critical concepts within institutional theory, playing a significant role in shaping institutional behavior and policy development. Normative pressures stem from the norms, values, and expectations established by professional communities and societal standards. These pressures influence institutions to conform to accepted practices and ethical standards, promoting homogeneity and legitimacy within a given field (DiMaggio, 150). For instance, in the renewable energy sector, normative pressures might arise from environmental advocacy groups, industry standards, and public opinion favoring sustainable practices. Coercive pressures, on the other hand, are exerted by external entities with authority or control over institutions, such as governments, regulatory bodies, and powerful stakeholders. These pressures often manifest through laws, regulations, and mandates that compel institutions to adopt certain behaviors or practices. In the context of renewable energy policy, coercive pressures include government-imposed targets for renewable energy adoption, emissions reductions, and compliance with environmental standards. Normative and coercive pressures are both theoretically expected to influence policy formation and implementation by creating a structured environment where institutions are motivated to conform to established norms and comply with regulatory demands (Dacin, 51). Normative pressures promote a shared understanding and collective commitment to certain values and practices, fostering a sense of community and collaboration among institutions. This can lead to the development of policies

that reflect widely accepted standards and ethical considerations, ensuring that institutions act in ways that are socially responsible and aligned with public expectations. Coercive pressures, meanwhile, enforce compliance through legal and regulatory mechanisms, ensuring that institutions adhere to mandated requirements. This compulsion can lead to the establishment of policies that may not have been voluntarily adopted but are necessary for achieving regulatory compliance and avoiding penalties. For example, state-imposed renewable energy targets, such as those in New York's Climate Leadership and Community Protection Act (CLCPA), compel energy providers to increase their use of renewable sources, thereby driving significant changes in energy policy and practice.

On one hand, these pressures can lead to greater standardization and consistency in policy implementation, as institutions align their behaviors with established norms and regulations. This alignment can enhance policy effectiveness, as institutions work towards common goals and adhere to clear guidelines. For instance, the widespread adoption of Renewable Portfolio Standards (RPS) across various states reflects the influence of both normative and coercive pressures in promoting renewable energy use and reducing greenhouse gas emissions. On the other hand, the interaction between normative and coercive pressures can also create tensions and challenges. Institutions may face conflicts between adhering to normative standards and meeting coercive requirements, especially if these pressures are not fully aligned. For example, while normative pressures might push for the adoption of the latest sustainable technologies, coercive pressures may mandate compliance with existing regulatory frameworks that do not yet accommodate these innovations. Furthermore, the effectiveness of policies influenced by normative and coercive pressures depends on the robustness of the enforcement mechanisms and the degree of societal consensus around the norms being promoted. Strong regulatory frameworks with clear penalties for non-compliance can likely drive more significant institutional changes and policy adherence. Similarly, policies that align with widely accepted societal values and norms are more likely to gain institutional support and achieve their intended outcomes (Kuzemko, 100).

IV. Alignment with Existing Literature

My theoretical framework extends existing scholarship on corporate tax incentives and renewable energy in several key ways. While previous studies often examine fiscal instruments like tax credits or subsidies as isolated financial incentives, my research situates these tools within the regulatory framework of California, Texas, and New York. Moreover, my work complements existing literature that explores the influence of various factors on policy formulation, particularly in environmental governance. However, it distinguishes itself by offering a more granular, state-level analysis, thereby filling an existing gap between macro-national studies and micro-local examinations. In essence, my framework not only enriches the traditional understanding of corporate tax incentives and regulatory frameworks, but also introduces a nuanced, state-specific approach that is deeply integrated with broader policy landscapes. This allows for a more comprehensive understanding of the interplay between legislative frameworks and renewable energy adoption at the state level.

Methodology

I. Research Design

This study employs a comparative case study approach to analyze the impact of state-specific renewable energy policies, including tax incentives and regulatory frameworks, on renewable energy uptake in New York, California, and Texas. The comparative case study method allows for an in-depth examination of how different states' policies have influenced renewable energy adoption, providing insights into the effectiveness of various approaches. The study analyzes renewable energy policies from 1999 to 2022 to capture the inception and evolution of key policies and their long-term impacts. The chosen timeline begins in 1999 with the introduction of Texas's Renewable Portfolio Standard (RPS) and extends to 2023 to include the latest available data. This period is selected to provide a historical perspective on the development and implementation of renewable energy policies, capturing significant legislative milestones. The timeframe includes numerous policy updates and expansions, offering a comprehensive view of how these policies have evolved and their impacts over time. This timeline allows for a comparative analysis of the effectiveness of different state-specific policies

in promoting renewable energy uptake. The study relies on primary and secondary data sources, including policy documents and legislative records from state government websites, reports and publications from the California Energy Commission, New York State Energy Research and Development Authority (NYSERDA), Texas Public Utility Commission, and other relevant agencies. Additionally, statistical data from the U.S. Energy Information Administration (EIA), state-specific energy agencies, and industry publications, as well as academic articles and research papers on renewable energy policy and its impacts, are utilized. These sources were chosen for their credibility, relevance, and comprehensive coverage of renewable energy policies and impacts in the respective states.

II. Case selection

The choice to focus on California, Texas, and New York as case studies is not random, but rather a deliberate methodological strategy aimed at providing a comprehensive and nuanced analysis of how corporate tax incentives and legislative frameworks contribute to the adoption of renewable energy. California, a state renowned for its pioneering efforts in environmental sustainability, presents a compelling case study for multiple reasons. Notably, California's intricate framework of corporate tax incentives is deliberately designed to accelerate the transition towards renewable energy. The state serves as a model for how a robust network of corporate tax incentives can be engineered to meet ambitious renewable energy objectives. Moreover, California's innovation-driven economy and stringent regulatory mandates act as crucial contextual variables that interact with these incentives, offering invaluable insights into the success factors for effective policy intervention. The complexity and success of California's approach make it an indispensable inclusion for this study. Texas stands in stark contrast to California but offers equally illuminating perspectives. Known for its business-friendly environment and as a long-standing epicenter of the traditional energy industry, Texas showcases the intricacies of introducing renewable energy into an economy deeply rooted in fossil fuels. The state’s specific corporate tax incentives for renewable energy serve as an interesting counterpoint to California, elucidating how subtler tax-based stimuli can operate within a fundamentally different political and cultural framework. The insights derived from Texas will

contribute to understanding the adaptability and limitations of corporate tax incentives in settings resistant to rapid renewable energy adoption. New York completes this triad, representing a nuanced intersection of high finance, progressive environmental policy, and a diverse economic landscape. The state's corporate tax incentives aim to couple its economic aspirations with a commitment to renewable energy. New York stands as a testament to how densely populated, financially robust states can utilize corporate tax incentives to balance economic vitality with environmental sustainability. Its policy architecture, although progressive like California, is uniquely situated within a different blend of socio-economic and cultural variables, offering yet another critical angle from which to examine the efficacy of corporate tax incentives.

By incorporating these three distinct states, this study accomplishes two key objectives. First, it ensures the analysis encompasses a range of policy approaches, from the aggressively progressive to the cautiously pro-business. Second, the economic, historical, and cultural diversities these states bring to the table ensure the findings are not narrowly prescriptive but have broader applicability. This considered selection thus equips the study with the depth and versatility required to produce both theoretically robust and practically actionable insights on the intricate dynamics between corporate tax incentives and renewable energy adoption.

III. Data analysis

The study uses qualitative content analysis to interpret the data and identify key themes related to policy effectiveness and outcomes. The analysis focuses on sorting the data into key themes such as Renewable Portfolio Standards (RPS), Renewable Energy Credits (RECs), tax incentives, financial mechanisms, regulatory frameworks, and emissions reductions. The collected data are organized chronologically and by state to facilitate comparative analysis. During thematic coding, sections related to these key themes are highlighted and categorized. For each theme, the analysis compares how the policies and their impacts differ between New York, California, and Texas, identifying patterns, similarities, and differences in how each state implements and benefits from these policies. The findings for each theme are then summarized, highlighting key insights and trends, and discussing how these themes collectively influence renewable energy adoption and policy effectiveness in each state. The comparative case study

approach is chosen for its ability to provide a detailed and contextual understanding of how different states' renewable energy policies influence adoption rates. By focusing on New York, California, and Texas, the study captures a diverse range of policy approaches and regulatory frameworks, offering a comprehensive analysis of what works and why. The qualitative content analysis method allows for an in-depth examination of policy documents and secondary data, enabling the identification of key themes and patterns that quantitative methods might overlook. This approach is well-suited to exploring the complexities and nuances of renewable energy policy implementation and its impacts. The chosen timeline from 1999 to 2022 ensures that the study covers the entire period of significant renewable energy policy development in the three states, providing a robust basis for analysis and comparison.

Case Study Analysis

New York

New York's renewable energy journey began significantly with the establishment of the Renewable Portfolio Standard (RPS) in 2004 by the New York State Public Service Commission (PSC). The RPS set an initial goal of achieving 25% of the state's electricity consumption from renewable energy sources by 2013. This target was designed to promote the development of renewable energy projects and reduce reliance on fossil fuels. The RPS included a variety of eligible renewable energy sources, such as wind, solar, biomass, hydroelectric, and other environmentally sustainable technologies (PSC, 2004). Since then, the Climate Leadership and Community Protection Act (CLCPA) and the Clean Energy Standard (CES) have set ambitious goals to increase the uptake of renewable energy. The CLCPA aims for a 100% reduction in greenhouse gas emissions by 2050, with a 40% reduction by 2030 (CLCPA, 2019). This legislation emphasizes the importance of substantial emissions reductions to limit global warming to 2°C and highlights the need for complementary adaptation measures to address unavoidable climate change risks. The CES complemented these goals by mandating that 50% of New York's electricity come from renewable sources by 2030. It requires Load Serving Entities (LSEs) to invest in renewable energy generation and acquire Renewable Energy Credits (RECs) to meet specific annual targets (CES, 2016). The New York State Energy Research and

Development Authority (NYSERDA) facilitates this by offering RECs for purchase and managing compliance mechanisms. The CES also includes a Zero-Emissions Credit Requirement to preserve the environmental attributes of zero-emission electric generating facilities. To support the development of clean energy markets, New York is reforming its regulatory framework through the Reforming the Energy Vision (REV) initiative. This initiative encourages utilities to partner with third-party providers to install clean, distributed energy resources and leverages technological innovation to improve system efficiency and reduce peak demand. The Clean Energy Fund (CEF), a $5 billion, ten-year program approved by the New York State Public Service Commission, supports this transition by addressing market barriers, stimulating private investment, and ensuring equitable access to clean energy for low- to moderate-income and rural communities (REV, 2016).

Figure # 1: New York Renewable Energy Production Estimates by Source (1999-2022)

Source: U.S. Energy Information Administration

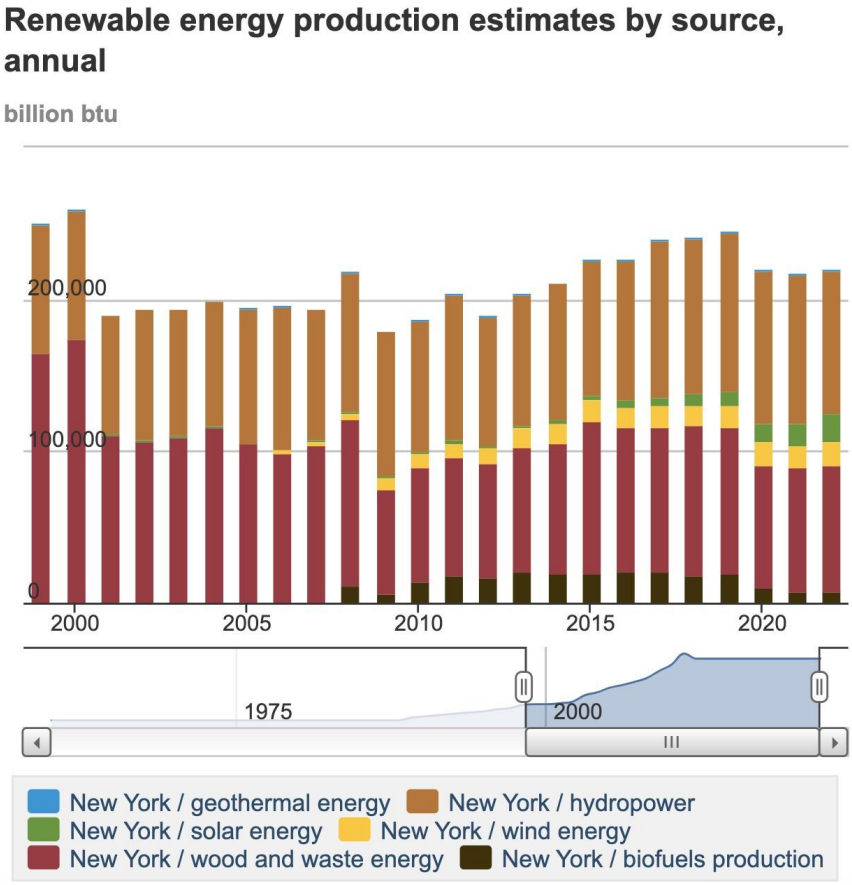
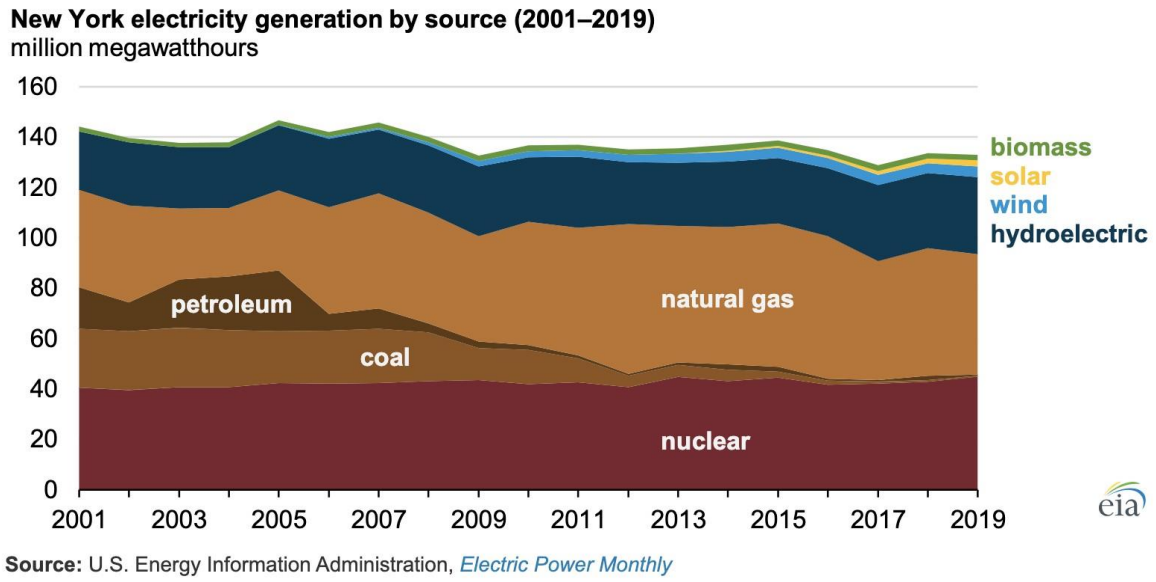


Figure # 2: New York Electricity Generation by Source (2001-2019)

Source: U.S. Energy Information Administration



Data from the U.S. Energy Information Administration (EIA) shows significant outcomes from New York's renewable energy policies. New York's renewable energy use saw noticeable growth soon after the implementation of its Renewable Portfolio Standard (RPS) in 2004, with wind making up most of the early growth. The introduction of the Clean Energy Standard (CES) in 2016 marked the beginning of significant growth in solar energy, reflecting the impact of these policies. Over the period from 2005 to 2019, the share of coal in New York's electricity generation fell dramatically from 14% to less than 1%, while natural gas-fired electricity grew from 22% to 36%. During the same period, electricity generation from renewable energy technologies collectively increased from 19% to 29%, highlighting the successful transition towards cleaner energy sources. In 2022, New York generated more power from renewable resources than any other state east of the Mississippi River, ranking seventh nationally in renewable-sourced electricity. Approximately 30% of New York's total net generation came from renewable sources, with the majority provided by hydroelectric plants. Solar energy experienced the most substantial growth, increasing its share of renewable energy to 4% of New York's total power generation in 2022. Wind energy also grew, though it was surpassed by solar in 2022. Wind accounted for 3.6% of New York's total net generation and about 12% of the state's

renewable electricity. As of September 2023, New York had more than 32 utility-scale wind farms, with significant onshore and offshore potential. Biomass contributed about 1.5% of New York's total net generation in 2022, ranking ninth in the nation. The state's biomass-generating capacity is primarily from municipal solid waste facilities and smaller landfill gas-fueled generators (EIA, 2023). In summary, New York's renewable energy policies have significantly increased the state's renewable energy production and diversified its energy portfolio. The steady rise in solar and wind energy, reduction in fossil fuel dependency, and success in increasing energy diversification demonstrates the effectiveness of New York's comprehensive regulatory framework.

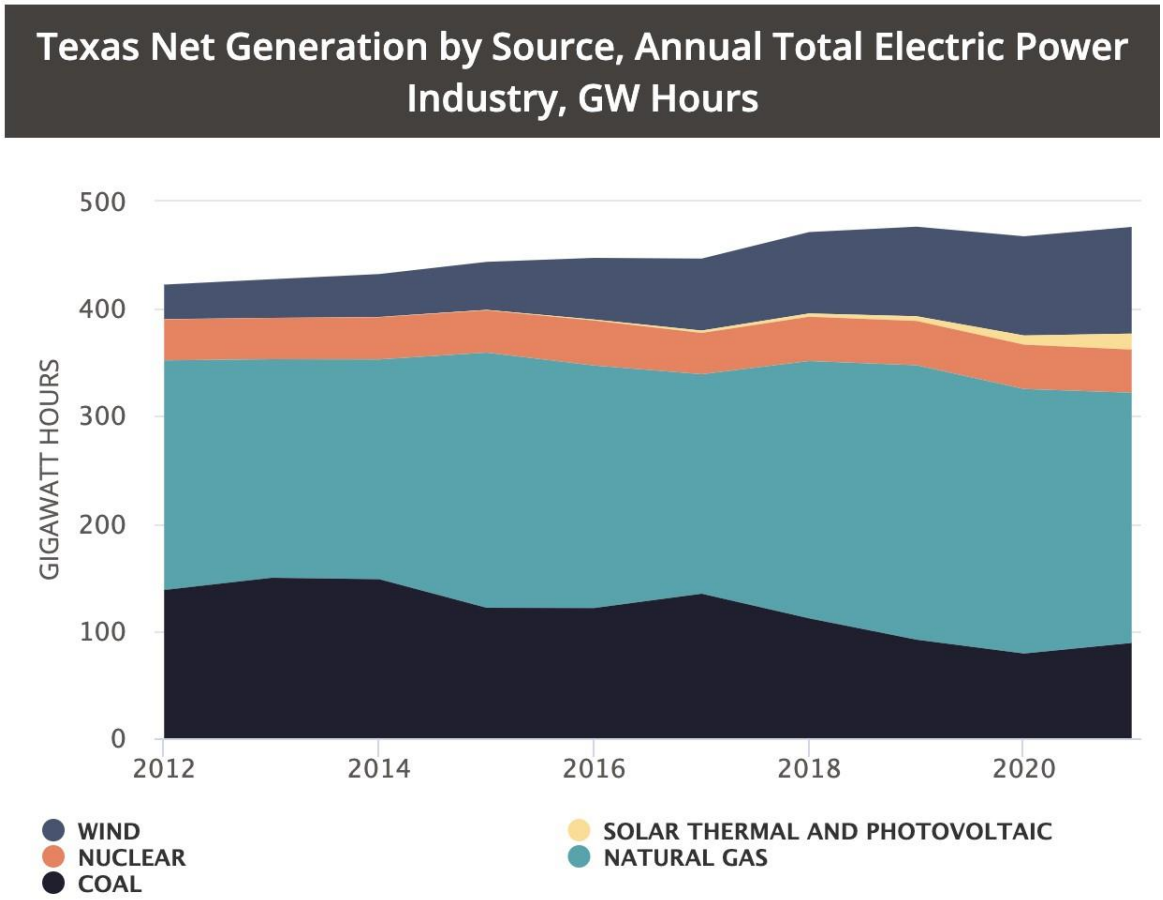
Texas

In Texas, renewable energy policies are driven by legislative acts such as Chapter 313, Senate Bill 7 (SB7), and Senate Bill 20 (SB20), which establish frameworks for promoting renewable energy through financial mechanisms, regulatory guidelines, and the Renewable Portfolio Standard (RPS). Chapter 313, also known as the Texas Economic Development Act, aims to stimulate economic growth by offering tax benefits to businesses that invest in local communities. The legislation specifies that these benefits should enhance local public education, create high-paying jobs, and support statewide economic development goals. School districts are responsible for strictly interpreting criteria and guidelines, ensuring that only investments beneficial to the community and the state receive tax breaks. Additionally, the law allows municipalities or counties to impose impact fees on properties receiving these tax benefits to cover infrastructure costs related to water, wastewater, storm water services, or roads (Texas Economic Development Act, 2001). Senate Bill 7 (SB7), passed in 1999, introduced the Renewable Portfolio Standard (RPS) in Texas, setting ambitious goals for increasing the state's renewable energy capacity. The RPS mandated the installation of an additional 2,000 megawatts of renewable energy capacity by 2009, with intermediate targets set for earlier years. SB7 also established a Renewable Energy Credits (REC) trading program, requiring retail electric providers to either directly own renewable energy capacity or purchase RECs to meet their renewable energy obligations (S.B. 7, 1999). This trading program incentivizes the development

of renewable energy projects by creating a market for RECs, which represent proof of renewable energy generation. Senate Bill 20 (SB20), enacted in 2005, expanded upon SB7 by increasing the renewable energy targets and facilitating the construction of necessary transmission infrastructure. SB20 raised the RPS goal to 5,000 megawatts of additional renewable capacity by 2015, with a further target of 10,000 megawatts by 2025. The bill directed the Public Utility Commission (PUC) to designate Competitive Renewable Energy Zones (CREZ) and develop plans for building transmission capacity to deliver renewable energy from these zones to consumers (S.B. 20, 2005). This approach ensures that renewable energy projects in areas with the highest potential are supported by adequate transmission infrastructure, thereby maximizing their economic and environmental benefits.

Figure # 3: Texas Net Generation by Source (2012-2022)

Source: Texas Comptroller



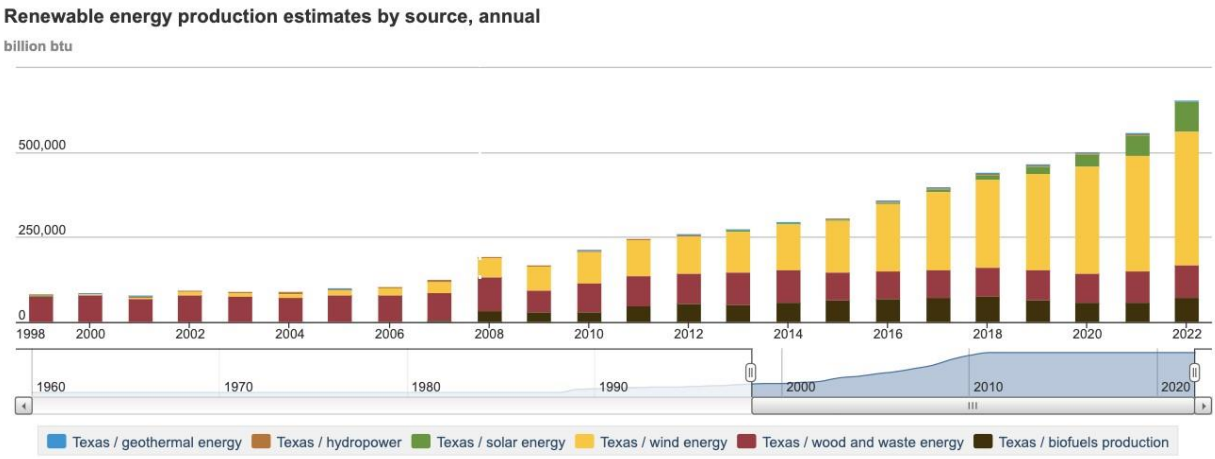


Figure # 4: Texas Renewable Energy Production Estimates by Source (1999-2022)
Source: U.S. Energy Information Administration

The impact of Texas's renewable energy policies is evident from data provided by the Texas Comptroller and the U.S. Energy Information Administration (EIA). Since the implementation of the Renewable Portfolio Standard (RPS) in 1999 through SB7, and subsequent expansions via SB20, Texas has seen substantial growth in renewable energy generation. Chapter 313, also known as the Texas Economic Development Act, has played a significant role in this expansion by offering tax incentives to businesses that invest in renewable energy projects, thus stimulating economic growth and supporting community development. Wind energy generation has seen the most significant change, rising from 1% of the state's renewable energy portfolio in 1999 to 60% in 2022, reflecting the success of these policies (EIA, 2022). The creation of Competitive Renewable Energy Zones (CREZ) has been pivotal in supporting this growth by ensuring adequate transmission infrastructure. Solar energy has shown a gradual increase, particularly from 2016 onwards, indicating positive trends driven by the REC trading program and incentives provided under Chapter 313. Although solar energy's growth has been slower compared to wind, it still reflects significant diversification in Texas's renewable energy portfolio.

By 2023, renewable sources provided almost three-tenths of Texas's total state electricity net generation, with the state accounting for about 16% of the nation's total renewable electricity

generation. Texas led the nation in utility-scale wind-powered electricity generation, producing nearly three-tenths of the U.S. total, with wind generating capacity making up about two-thirds of Texas's total renewable capacity. Texas was the country's second-largest producer of solar power in 2023, with total solar generating capacity accounting for about 6% of the state's total electricity generation. Power plant developers plan to add almost 24,000 megawatts of utility-scale solar generating capacity during 2024 and 2025, further stimulated by the tax incentives under Chapter 313. Biomass, though a smaller contributor, along with wood-derived fuels and landfill gas facilities, added to Texas's renewable energy mix (EIA, 2024). Overall, Texas has seen substantial growth in wind energy due to favorable policies, tax incentives, and infrastructure investments. The legislative framework in Texas, particularly the role of Chapter 313, SB7, and SB20, has been effective in meeting renewable energy targets, particularly for wind energy.

California

The California Renewables Portfolio Standard (RPS) Program, initiated under Senate Bill 1078, requires retail sellers of electricity, including electrical corporations, community choice aggregators, and electric service providers, to procure a specified minimum percentage of electricity from eligible renewable energy resources. This mandate ensures that each electrical corporation increases its procurement of renewable energy by at least 1% per year, aiming to achieve 20% of retail sales from renewable sources. The Public Utilities Commission (PUC) is responsible for implementing this standard, establishing market prices, ranking least-cost and best-fit renewable resources, and reviewing renewable procurement plans and contracts. The California Energy Commission (CEC) supports these efforts by certifying eligible renewable resources, implementing an accounting system for compliance verification, and awarding supplemental energy payments for above-market costs (S.B. 1078, 2002).

Senate Bill 100 further advances California’s renewable energy goals, setting more ambitious targets. It mandates that 60% of retail electricity sales come from renewable resources by 2030, with an ultimate goal of 100% zero-carbon electricity by 2045. This bill aligns with the state’s commitment to reducing greenhouse gas emissions and ensures that the transition to

renewable energy does not lead to increased emissions elsewhere in the western grid. The PUC, CEC, and the California Air Resources Board (CARB) are tasked with incorporating these goals into their planning and regulatory frameworks, ensuring a coordinated effort towards a carbon-neutral electricity system (S.B. 100, 2018). In addition to RPS, California has implemented the Cap-and-Trade Program under Assembly Bill 32. This program, effective from January 1, 2013, sets a declining cap on emissions from the sectors with the highest greenhouse gas (GHG) emissions, eventually covering 85% of the state's emissions. The Cap-and-Trade Program provides regulatory certainty and flexibility for companies to meet their emission reduction targets at the lowest cost. It requires polluters to obtain and surrender allowances for each ton of GHG they emit, with the number of allowances decreasing over time. Companies can meet their obligations through a combination of on-site reductions, allowance purchases, and verified offsets (AB32, 2006). This program ensures that California meets its GHG reduction targets while promoting local and regional air quality improvements. This is further supported by various financial mechanisms. The Cap-and-Trade Program, for example, generates revenue that is reinvested in clean energy projects through the Greenhouse Gas Reduction Fund (GGRF).

Figure # 5: California Renewable Energy Production Estimates by Source (1999-2022)
Source: U.S. Energy Information Administration

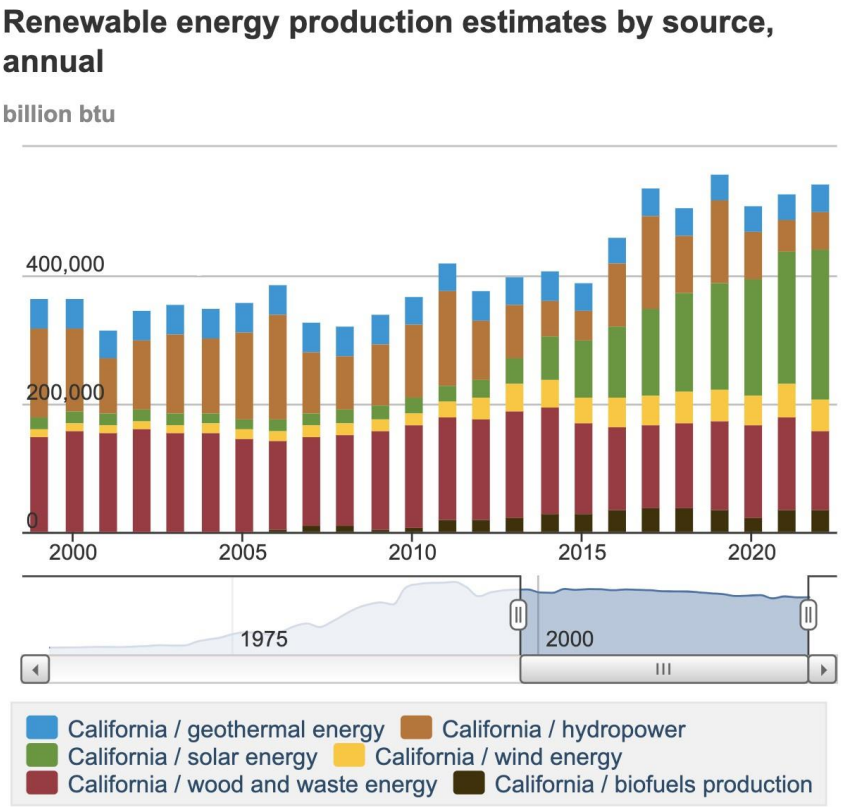
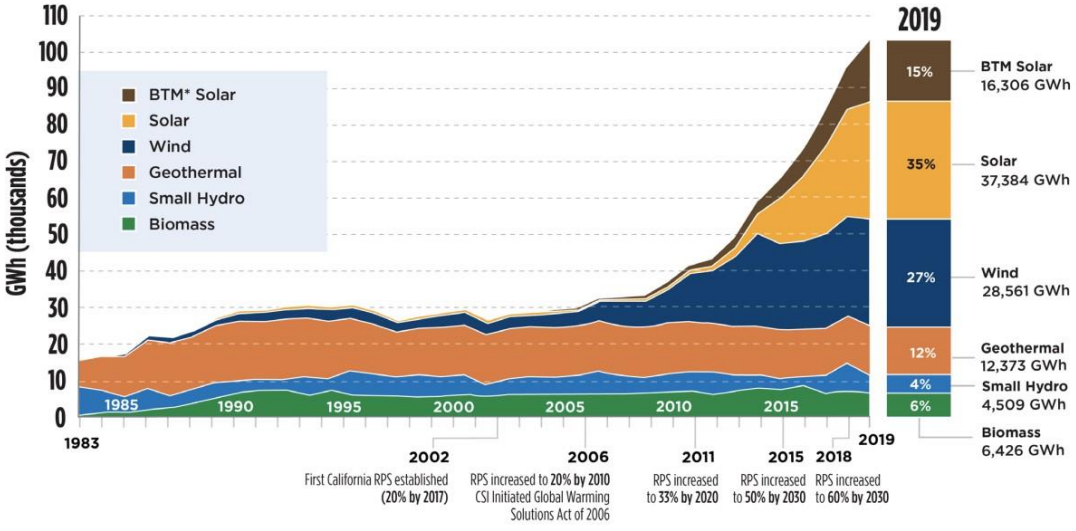


Figure # 6: California Total Renewable Generation (1983-2019)

Source: California Energy Commission

Figure 11: Total Renewable Generation Serving California Load by Resource Type



California's renewable energy policies, particularly the Renewables Portfolio Standard (RPS) Program initiated under Senate Bill 1078 and expanded through Senate Bill 100, have

significantly increased renewable energy generation. Data from the California Energy Commission and the U.S. Energy Information Administration show marked growth in solar and wind energy. California's solar energy share of the state's energy portfolio increased dramatically, rising from 5% in 1999 to nearly 45% in 2023 (EIA, 2024). By 2019, wind energy provided 27% of the renewable generation, supported by policy-driven infrastructure investments, though it accounted for only 6% of California's total in-state electricity generation by 2023. Additionally, California leads the nation in solar and geothermal energy production and ranks second in biomass and hydroelectric power generation. Geothermal energy contributed 12% of renewable generation in 2019, with California producing 67% of the nation's utility-scale geothermal electricity. Biomass and hydro accounted for smaller portions, providing 6% and 4% respectively (CEC, 2021). The effectiveness of California's RPS, which mandates 60% renewable electricity by 2030 and 100% zero-carbon electricity by 2045, along with supporting financial mechanisms and regulations, is evident in the state's successful renewable capacity expansion. These mandates have driven significant investments in renewable infrastructure and have led to substantial increases in renewable energy generation. The state’s leadership in solar alongside its rapidly growing wind energy sector highlights the success of its comprehensive renewable energy strategy.

Comparative Analysis

Synthesis of Key Findings

The renewable energy policies of New York, Texas, and California have led to significant and diverse outcomes, reflective of their unique legislative approaches and goals. In New York, the Renewable Portfolio Standard (RPS) initiated in 2004 and the Clean Energy Standard (CES) established in 2016 have driven substantial growth in wind and solar energy, respectively. By 2022, approximately 30% of New York's total net generation came from renewable sources, with solar and wind increasing the most. Texas has seen substantial growth in renewable energy, driven by legislative acts like Senate Bill 7 (SB7), Senate Bill 20 (SB20), and Chapter 313. These policies have made Texas a leader in wind energy generation, with wind energy constituting 60% of Texas's renewable energy portfolio by 2022. California's ambitious

renewable energy policies, particularly the RPS Program initiated under Senate Bill 1078 and expanded through Senate Bill 100, have significantly expanded renewable energy generation, especially in solar.

Comparison of Tax Incentives and Financial Mechanisms

Tax incentives and financial mechanisms play critical roles in promoting renewable energy adoption in New York, Texas, and California, though each state employs distinct strategies tailored to its policy goals and energy landscape. In New York, the Renewable Energy Credits (RECs) system and the Clean Energy Fund (CEF) are central to the state's renewable energy strategy. The Clean Energy Standard (CES) mandates that Load Serving Entities (LSEs) invest in renewable energy generation and acquire RECs to meet specific annual targets. The New York State Energy Research and Development Authority (NYSERDA) facilitates this by offering RECs for purchase and managing compliance mechanisms. Additionally, the NY Green Bank, part of the Reforming the Energy Vision (REV) initiative, provides financial products such as credit enhancements and securitization to overcome market barriers and stimulate private sector investment in renewable energy projects. These mechanisms have effectively driven growth in both solar and wind energy, aligning with the state's ambitious goals set by the Climate Leadership and Community Protection Act (CLCPA).

Texas utilizes Chapter 313 of the Texas Tax Code to offer significant tax benefits to businesses investing in renewable energy. This legislative act provides value limitations on appraised property values for school district maintenance and operations taxes, which has been crucial for the expansion of utility-scale solar and wind projects. The REC trading program established under Senate Bill 7 (SB7) and expanded by Senate Bill 20 (SB20) further incentivizes renewable energy development by creating a market for RECs. This program requires retail electric providers to either directly own renewable energy capacity or purchase RECs to meet their obligations, encouraging both the development of new renewable projects and the growth of existing ones. These financial incentives have been instrumental in making Texas a leader in wind energy generation and promoting gradual increases in solar energy capacity.

California employs a combination of Cap-and-Trade revenue and various financial mechanisms to support its renewable energy goals. The Cap-and-Trade Program, established under Assembly Bill 32, sets a declining cap on greenhouse gas emissions and allows for the trading of emissions allowances. This program generates revenue that is reinvested in clean energy projects through the Greenhouse Gas Reduction Fund (GGRF). Additionally, California's Renewable Auction Mechanism (RAM), Feed-in Tariffs (FIT), the California Solar Initiative (CSI), and Net Energy Metering (NEM) provide financial incentives for both large-scale and distributed renewable energy projects. These tools have been critical in driving significant investments in solar and wind energy, helping the state achieve its ambitious targets set by Senate Bill 100.

Overall Outcomes and Trends

Across New York, Texas, and California, renewable energy adoption has shown significant growth, driven by a comprehensive and evolving approach where policies are implemented together rather than in isolation. In New York, the Renewable Portfolio Standard (RPS) and the Clean Energy Standard (CES) have been supplemented by continuous enhancements like the Reforming the Energy Vision (REV) initiative and the Clean Energy Fund (CEF). This coordinated approach ensures sustained momentum and adaptability in the state's renewable energy policy. Similarly, Texas has built upon its RPS introduced in Senate Bill 7 (SB7) with subsequent legislation like Senate Bill 20 (SB20) and Chapter 313, providing ongoing financial incentives and infrastructure support. California's ambitious RPS, starting with Senate Bill 1078 and expanded through Senate Bill 100, is continually bolstered by the Cap-and-Trade Program and various financial mechanisms. This trend of implementing policies in a coordinated and maintained manner, with regular updates and complementary initiatives, seem to have been instrumental in driving the states' renewable energy successes. The coordinated implementation of Renewable Portfolio Standards (RPS), financial incentives, and regulatory frameworks in New York, Texas, and California offers valuable insights into effective strategies for promoting renewable energy adoption.

In New York, the synergy between the RPS, CES, and financial incentives like

Renewable Energy Credits (RECs) has fostered substantial growth in both wind and solar energy. The state's continuous policy enhancements, such as the Clean Energy Fund (CEF) and the Reforming the Energy Vision (REV) initiative, ensure sustained progress and community engagement in the renewable energy transition. Texas's approach demonstrates the effectiveness of combining robust tax incentives, such as those provided by Chapter 313, with a strong REC trading program to attract significant renewable energy investments. The creation of Competitive Renewable Energy Zones (CREZ) has been particularly effective in ensuring the necessary infrastructure to support wind energy development, highlighting the importance of infrastructure investments alongside financial incentives. California's comprehensive policy framework, integrating the RPS with the Cap-and-Trade Program and various financial incentives like the Renewable Auction Mechanism (RAM) and Feed-in Tariffs (FIT), underscores the success of a multi-faceted approach. The state's leadership in solar and geothermal energy production showcases the benefits of combining stringent regulatory standards with innovative financial mechanisms and long-term planning.

The best practices from these case studies highlight the importance of a coordinated policy approach, where RPS mandates, financial incentives, and regulatory frameworks work together to drive renewable energy adoption. Ensuring policy flexibility to adapt to evolving technologies and market conditions is crucial. Additionally, fostering public and private sector collaboration, as well as community engagement, can enhance the effectiveness and acceptance of renewable energy policies. These strategies collectively contribute to a sustainable and resilient energy transition, offering a blueprint for other states and regions aiming to expand their renewable energy capacity.

Application of Theoretical Frameworks

Applying Agency Theory and Institutional Theory provides a comprehensive framework for understanding the observed outcomes and interactions in the renewable energy policies of New York, Texas, and California. Agency Theory, which focuses on the dynamics between government bodies (principals) and private energy firms (agents), is particularly relevant in these states. In New York, the Clean Energy Standard (CES) requires Load Serving Entities (LSEs) to

invest in renewable energy and acquire Renewable Energy Credits (RECs). This setup exemplifies a principal-agent relationship where the state mandates and oversees private firms' compliance with renewable energy targets. Performance-based incentives and the facilitation by the New York State Energy Research and Development Authority (NYSERDA) help align the interests of both parties, thereby minimizing information asymmetry and moral hazard. Similarly, in Texas, the Renewable Portfolio Standard (RPS) and Chapter 313 tax incentives encourage private investment in renewable energy projects. The substantial increase in wind energy generation, making up 60% of Texas's renewable energy portfolio by 2022, highlights the success of these policies in leveraging private sector participation. These well-designed incentive structures align the interests of private firms with public policy goals, demonstrating how agency relationships can drive significant growth in renewable energy adoption.

Institutional Theory offers insights into how evolving societal values and institutional changes have shaped renewable energy policies in New York, Texas, and California. This theory emphasizes the importance of institutional adaptation and value shifts in driving policy development. In California, for example, the Renewable Portfolio Standard (RPS) has evolved from an initial target of 20% renewable energy to a more ambitious goal of 100% zero-carbon electricity by 2045, as mandated by Senate Bill 100. This progression reflects a shift in societal values towards more aggressive climate action and sustainability. Institutional Theory also highlights the role of normative and coercive pressures in influencing policy and institutional behavior. Normative pressures, such as public opinion and environmental advocacy, push institutions towards adopting sustainable practices. In New York, the Climate Leadership and Community Protection Act (CLCPA) embodies this, as societal demand for substantial emissions reductions and climate action drives the state to set ambitious renewable energy targets. Coercive pressures, exerted by regulatory mandates and government policies, compel institutions to conform to these new standards. Analyzing these states through the lens of Institutional Theory reveals how value shifts and regulatory pressures combine to shape comprehensive and adaptive renewable energy policies, driving significant growth and innovation in the sector.

Discussion

The findings of this thesis reveal significant insights into how state-specific renewable energy policies in New York, Texas, and California have influenced renewable energy adoption. New York's ambitious legislative measures, such as the Climate Leadership and Community Protection Act (CLCPA) and the Clean Energy Standard (CES), have driven substantial increases in the state's renewable energy capacity, particularly in wind and solar power. California's comprehensive strategy, which integrates the Renewable Portfolio Standard (RPS) with a cap-and-trade program and various financial incentives, has propelled significant growth in solar and geothermal energy production. Texas's market-driven approach, characterized by tax incentives under Chapter 313 and a Renewable Energy Credits (RECs) trading program, has positioned the state as a national leader in wind energy generation, while also showing substantial growth in solar energy. These findings support the hypothesis that states with a combination of stringent regulatory frameworks and substantial financial incentives will demonstrate higher rates of renewable energy adoption. However, Texas, which relies more on market-driven incentives, has also shown impressive outcomes, especially in wind energy. This suggests that while comprehensive policy frameworks that integrate strict regulatory measures with robust financial incentives are highly effective, market-driven approaches can also yield significant renewable energy growth, particularly when supported by favorable economic and geographic conditions. Therefore, the success of renewable energy adoption can be achieved through different policy mechanisms, provided they are well-designed and tailored to the state's specific context.

The results of this study have several important implications for policymakers. The success of New York and California underscores the importance of comprehensive policy frameworks that combine regulatory mandates with financial incentives. Policymakers in other states should consider adopting similar multifaceted approaches to enhance renewable energy adoption. The continuous improvement and updating of policies, as seen in New York's Reforming the Energy Vision (REV) initiative and California's expansion of its RPS, are crucial for maintaining momentum in renewable energy development. Regular policy reviews and updates can help address emerging challenges and leverage new technological advancements. Furthermore, Texas's experience highlights the effectiveness of combining tax incentives with

infrastructure investments. While regulatory mandates are important, balancing them with market-driven incentives can attract private sector investment and drive substantial renewable energy growth. Effective renewable energy policies require the involvement of various stakeholders, including government bodies, private firms, and communities. Collaborative governance models that ensure the alignment of interests among all parties can enhance policy effectiveness and acceptance.

Conclusion

This thesis analyzed the renewable energy policy frameworks of New York, Texas, and California, showing that comprehensive frameworks combining regulatory measures with financial incentives have been highly effective in promoting renewable energy adoption. The three states demonstrated that integrating policies and updating them regularly is crucial for success. By examining the legislative and regulatory mechanisms in these states, it became evident that policies were part of broader, continuously evolving frameworks rather than isolated initiatives. This adaptability allowed each state to respond to emerging challenges and technological advancements, ensuring sustained momentum and significant increases in renewable energy capacity, particularly in wind and solar power. The study found that the success of these policies was not only due to their design but also their implementation within a dynamic and adaptive framework. Regular updates and enhancements to policies ensured that the states could keep pace with technological progress and market conditions. This iterative process allowed for continual improvement and adaptation, maintaining the effectiveness of renewable energy policies over time.

Despite the successes observed, several uncertainties remain. This study has several limitations that should be acknowledged. The analysis is limited to three states with distinct energy landscapes and policy approaches. While the findings provide valuable insights, they may not be fully generalizable to other states or regions with different contexts. Additionally, the study relies on secondary data sources, which may have limitations in terms of accuracy and comprehensiveness. Future research could benefit from primary data collection to provide a more detailed understanding of the impacts of specific policies. Additionally, future research can

build on this study by exploring several areas. Expanding the comparative analysis to include additional states with varying policy frameworks can provide a broader understanding of the effectiveness of different renewable energy policies. Investigating the role of technological advancements in shaping renewable energy adoption and how policies can be designed to support technological innovation can further enhance policy effectiveness. Additionally, examining the socioeconomic impacts of renewable energy policies, including job creation, economic development, and social equity, can provide a more comprehensive understanding of their broader implications. By addressing these areas, future research can contribute to a more nuanced understanding of how state-specific renewable energy policies influence adoption rates and overall energy transitions.

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