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The Energy–Development Nexus in the Trump Era

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ABSTRACT: Energy policy is a central arena in which national development priorities and global climate objectives collide, and the first Trump administration (2017–2021) offers a critical case of this collision. The core paradox examined here is that policies designed to deliver short-term gains in output, employment, and export capacity may simultaneously erode the institutional capacity, investment certainty, and international alignment on which long-term sustainable development depends. This study analyzes U.S. energy policies during Donald Trump’s first presidential term within the framework of “energy dominance” and the energy–development–climate nexus, focusing on the withdrawal from the Paris Agreement, the relaxation of environmental regulations, and the promotion of fossil fuel production. Methodologically, the study combines qualitative document analysis of primary policy documents—executive orders, federal regulatory actions, and official policy statements issued between 2017 and 2021—with descriptive statistics on production, trade, employment, investment, and emissions drawn from official and industry-standard statistical sources for 2013–2020 (including sub-period contrasts of average annual changes between 2013–2016 and 2016–2019), and it employs a theory-driven, mechanism-based analytical strategy rather than causal-inference techniques. The results indicate that the energy dominance agenda coincided with record hydrocarbon production and the country’s first net-energy-exporter position in decades, yet oil and gas extraction employment remained below its 2014 peak, coal production and coal-fired generation continued their structural decline, and clean energy investment weakened relative to other major economies at the end of the term. The analysis concludes that Trump-era policies delayed rather than fundamentally reversed the U.S. energy transition, and that they were associated with heightened carbon lock-in risks, regulatory uncertainty, and tensions with the international climate regime. These findings offer comparative lessons for energy-hub aspirants and import-dependent developing economies such as Türkiye.

KEYWORDS: Energy policy; economic development; Trump era; energy dominance; fossil fuels; energy transition; climate governance; sustainable development

1 Introduction

Energy plays a key role in development debates because it is a fundamental input that influences production capacity, economic competitiveness, and social welfare in modern economies [1,2]. Although neoclassical growth theories generally treat energy as an indirect factor within the production process, the fields of energy economics and ecological economics consider the relationship between energy consumption and economic growth as an independent area of analysis [3]. While empirical studies have produced different findings regarding the direction of causality between energy consumption and economic growth across countries and time periods, most research agrees that energy is an essential driver of economic activity and that limitations in energy supply can restrict growth and development [4–6].

At the same time, the growing impacts of climate change and global warming have increased concerns about the sustainability of carbon-intensive growth models and their implications for future generations [7]. International initiatives such as the Paris Agreement and the Sustainable Development Goals have introduced new responsibilities for governments, particularly in reducing carbon emissions, expanding renewable energy sources, and supporting just energy transitions. As a result, energy policies should be assessed not only in terms of their contribution to economic growth and employment but also with regard to their effects on emissions, climate commitments, and long-term institutional stability [8].

Donald Trump's first presidential term (2017–2021) represents an important period in which the tensions between economic development, energy policy, and climate commitments became particularly visible. During this period, the administration pursued a strategy aimed at strengthening the United States' position as a leading producer and exporter of fossil fuels, guided by the principles of "America First" and "energy dominance" [9]. Energy policy was justified through objectives such as achieving energy independence, improving economic competitiveness through affordable energy, and supporting job creation. Consistent with these goals, the administration introduced a broad range of regulatory changes in both the energy and environmental sectors. According to the White House's "Energy & Environment" reports, rising oil and natural gas production, the country's emergence as a net energy exporter, and the revision of environmental regulations were presented as key achievements of the administration's energy agenda [10].

The existing literature examines Trump-era energy policies from a variety of perspectives. Guliyev [9] argues that the "America First" energy doctrine contributed to a reconfiguration of the global energy order by taking advantage of the shale oil revolution and the United States' emergence as a net energy exporter. His analysis emphasizes the geopolitical implications of a more unilateral and neo-mercantilist energy strategy. Focusing on domestic policy, Klass [11] investigates regulatory changes in areas such as electricity, transportation, and energy development on public lands between 2016 and 2020, assessing the extent to which policy outcomes reflected the administration's stated energy priorities. Similarly, Yozwiak et al. [12] examine eighty-four energy policy reversals implemented during the same period and find that many of these initiatives had limited practical effects due to legal challenges, judicial review, and policy uncertainty. Their findings highlight the importance of institutional and governance factors in shaping the effectiveness of federal energy policies.

The decision to withdraw from the Paris Agreement was one of the most symbolic steps of the Trump era; this decision has been the subject of intense debate with regard to both international climate governance and the U.S. economy. Ward and Bowen [13] critically evaluate the economic arguments advanced by the Trump administration to support its withdrawal from the Paris Agreement and conclude that many of these claims lack a strong empirical foundation. Likewise, a growing body of research has explored the possible consequences of the U.S. withdrawal for global emissions, international climate cooperation, and the climate commitments of other countries [14]. Despite these contributions, much of the existing literature approaches Trump-era energy and climate policies from either a geopolitical perspective or a legal and regulatory standpoint. Comparatively less attention has been paid to the broader relationship between energy policy and development outcomes, particularly regarding how changes in energy policy may influence economic growth, employment, trade performance, and emissions at the macroeconomic level.

This study seeks to address this gap by adopting a theoretical and analytical perspective. It examines how the fossil fuel-oriented energy policies pursued during Trump's first presidential term were linked to broader development objectives and how these objectives were supported through specific policy instruments within the energy–development–climate framework. To achieve this, the study draws on executive orders, regulatory actions taken by federal agencies, official policy statements, and the relevant academic literature to explore the potential implications of these policies and the mechanisms through which they may have

influenced development outcomes. The study's contribution can be distinguished from the strands of literature reviewed above—work on Trump-era energy policy, carbon lock-in, the energy transition, and climate governance—in three respects. First, unlike the geopolitical accounts exemplified by Guliyev [9] and the legal-regulatory analyses of Klass [11] and Yozwiak et al. [12], it places the concept of development itself at the center of the analysis and operationalizes it through observable indicators—output, employment, trade performance, investment, and emissions—reported in [Section 5](#). Second, it consolidates the administration's dispersed regulatory actions into a single policy inventory and maps their potential implications onto the Sustainable Development Goals through a qualitative impact matrix. Third, it derives explicit comparative lessons for import-dependent developing economies, an extension that the existing case literature has largely left implicit. Taken together, these elements yield an analytical claim that existing accounts state only in passing: the Trump-era record is best read not as a reversal of the U.S. energy transition but as a costly delay, and the mechanisms, indicators, and boundary conditions of that delay are specified here explicitly enough to be tested by subsequent research.

At the heart of the analysis lies what may be called the core paradox of Trump-era energy policy: the very instruments that were expected to deliver short-term gains in gross domestic product (GDP), employment, and export capacity—deregulation, accelerated permitting, and fossil fuel promotion—may simultaneously erode the institutional capacity, investment certainty, and international institutional alignment on which long-term sustainable development depends. This structural conflict between short-term economic performance and the long-term foundations of development runs through the entire analysis and frames both the mechanism-based discussion and the descriptive evidence presented below.

The main research questions of the study are formulated as follows:

- (i) How did Trump-era energy policy frame development, and through which policy tools did it institutionalize the goal of “energy dominance”?
- (ii) What key tensions and policy dilemmas have steps such as withdrawing from the Paris Agreement and rolling back climate/environmental regulations generated in terms of energy transition, investment uncertainty, and sustainable development goals?

The study is expected to contribute to the literature in three main ways. First, it critically examines the claims of the energy dominance discourse regarding economic growth, employment, and competitiveness by drawing on policy documents, existing empirical evidence, and descriptive statistics from official sources. Second, it discusses the environmental costs and transition challenges associated with fossil fuel-based development strategies by linking them to the broader literature on sustainable development and energy transition. Third, the U.S. case is used as a reference point to derive policy lessons for countries seeking to strengthen their position in energy markets, particularly energy-hub states and import-dependent developing economies such as Türkiye.

The remainder of the article is organized as follows. [Section 2](#) reviews the theoretical perspectives and empirical studies on the relationship between energy, development, and climate change, while outlining the concepts of sustainable development, energy dominance, carbon lock-in, and the global climate regime. [Section 3](#) describes the data and the methodological approach of the study, including the document corpus, the source-selection strategy, and the analytical procedure. [Section 4](#) focuses on the institutional, political, and discursive aspects of Trump-era energy policies, including the withdrawal from the Paris Agreement and the major regulatory changes. [Section 5](#) discusses the implications of these policies for development dynamics through a mechanism-based analysis supported by descriptive evidence, paying particular attention to the tension between energy dominance and sustainable development, multi-level governance, just transition, the comparative implications for Türkiye, and the continuity of these policies into

the second Trump administration. Finally, [Section 6](#) summarizes the main findings, highlights key policy implications, and suggests directions for future research.

2 Theoretical and Literature Framework of the Energy–Development–Climate Relationship

The literature on the relationship between energy, development, and climate has expanded considerably over the past four decades, in terms of both its scope and its analytical depth; systematic reviews of the energy–growth component alone document more than a thousand studies and successive generations of econometric method [\[4\]](#). Traditional growth theories generally regard energy as a factor embedded within capital and labor, whereas studies in energy economics and ecological economics highlight the direct contribution of energy services to production processes and societal welfare [\[15\]](#) (p. 188). From a biophysical perspective, economic activity is constrained by thermodynamic realities, suggesting that economic growth cannot be fully understood without considering energy flows and resource use [\[5,16\]](#) (p. 892). This perspective broadens the discussion of energy and development by drawing attention to the environmental and climate-related consequences of fossil fuel-based growth patterns.

The extensive literature examining the causal relationship between energy consumption and economic growth is classified around four main hypotheses. These are the growth, conservation, feedback, and neutrality hypotheses. Ahmad et al. [\[4\]](#), in a citation-based systematic review of the energy–growth literature, define the “growth hypothesis” as the case in which energy consumption supports growth in a unidirectional manner; in this case, constraints in energy supply become a direct constraint on growth. Payne [\[6\]](#), on the other hand, reveals that causality is often sensitive to context, methods used, and data period in different country examples; in some cases, causality from growth to energy is present, in some cases bidirectional causality, and sometimes there is no statistically significant relationship. The growth hypothesis warns that policies aimed at energy conservation may have a negative impact on economic performance, while the conservation hypothesis suggests that energy efficiency and demand management policies can be implemented without generating a significant cost to growth. The feedback hypothesis proposes a more complex structure where energy and growth mutually reinforce each other; the neutrality hypothesis suggests a situation where changes in energy demand have limited significance in terms of macroeconomic growth dynamics [\[4,6\]](#) (p. 55). More recent surveys confirm that these four hypotheses continue to structure the empirical literature [\[17\]](#), including the rapidly growing branch that focuses on renewable energy consumption and growth [\[18\]](#).

These four hypotheses are directly relevant for interpreting Trump-era energy policy. The administration’s argument that abundant, low-cost energy would stimulate output and employment—and, conversely, that environmental regulation constitutes a “job-killing” constraint on growth—rests implicitly on the growth hypothesis, under which energy supply restrictions translate into binding growth restrictions. If, however, the conservation or neutrality hypotheses better describe the U.S. economy—an advanced, increasingly service-based economy with declining energy intensity—then the developmental returns to expanding fossil fuel supply are correspondingly smaller, and the environmental costs of deregulation are incurred without the promised growth dividend. The four-hypothesis framework therefore provides the analytical baseline against which the administration’s growth and employment claims are assessed in [Sections 4](#) and [5](#).

Over time, this debate has expanded beyond economic output to include issues such as employment, foreign trade, and sectoral development [\[19\]](#) (p. 336). Research on the effects of energy consumption on industrial production, labor markets, and export performance suggests that fluctuations in energy prices can have substantial impacts on unemployment and external balances, particularly in economies that rely heavily on energy-intensive industries. More recent studies incorporating variables such as CO₂ emissions, energy

prices, and foreign trade indicate that the energy–growth relationship also involves a trade-off between economic expansion and environmental sustainability. These studies show that economic growth is often accompanied by rising greenhouse gas emissions under existing production and consumption patterns [20] (p. 1157), [21]. Evidence for the United States specifically confirms this pattern: examining the effects of GDP and of different types of energy consumption on emissions with state-level data for 1997–2016, Salari et al. [22] find a significant long-run relationship between energy consumption and CO₂ emissions. Therefore, energy policies should be assessed not only in terms of energy security and economic costs but also with regard to their implications for emissions and climate commitments.

The sustainable development literature adds a normative and institutional dimension to the energy–growth debate. Our Common Future, known as the Brundtland Report, conceptualized the balance between economic growth and environmental limits by defining sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [23]. The concept of sustainable development requires energy systems to be both accessible and affordable for all (combating energy poverty) and to limit emissions and ecological damage [24] (p. 158). Therefore, energy policy becomes a vehicle not only for short-term growth and employment goals, but also for intergenerational justice, ecosystem integrity, and long-term prosperity.

The United Nations Sustainable Development Goals (SDGs) offer a more operational framework for addressing the relationship between energy and sustainability. SDG 7 emphasizes ensuring access to affordable, reliable, sustainable, and modern energy for all, while SDG 13 focuses on climate action and the mitigation of climate change [25]. Together, these goals require policymakers to balance two interconnected objectives: expanding access to energy while reducing greenhouse gas emissions. Measures such as improving energy efficiency, increasing investments in renewable energy, and modernizing energy infrastructure play a crucial role in achieving this balance. Nevertheless, economies that rely heavily on fossil fuels often face the challenge of carbon lock-in. Following Seto et al. [26] (p. 426–427), carbon lock-in is defined here as the self-reinforcing inertia created by the interaction of three mutually supporting dimensions: (i) technological and infrastructural lock-in, arising from long-lived, capital-intensive energy assets; (ii) institutional lock-in, arising from the political and regulatory arrangements that grow up around those assets; and (iii) behavioral lock-in, arising from the habits and expectations of firms and households. Because energy infrastructure typically remains in operation for decades, current investment decisions can commit future emission trajectories far beyond the political cycle in which they are made; recent estimates indicate that emissions committed by existing fossil fuel extraction projects alone would already exhaust the carbon budget consistent with 1.5°C [27]. This definition is used throughout the remainder of the article, and the analysis in Section 5 refers back to it rather than redefining the concept. A parallel and rapidly developing strand of climate governance research addresses the supply side directly, examining policies that restrict fossil fuel production itself—production bans, phase-out commitments, and producer alliances—and assessing them against the gap between planned production and levels compatible with the Paris Agreement [28].

Another important factor shaping the relationship between energy and development is the global climate regime. The United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement adopted in 2015 have established clear targets for limiting global warming, aiming to keep the increase in global average temperature well below 2°C and preferably below 1.5°C compared to pre-industrial levels [29] (p. 2). These commitments place increasing pressure on countries to align their development and energy policies with climate objectives. A key component of the Paris Agreement is the Nationally Determined Contributions (NDCs), which outline each country’s plans for reducing greenhouse gas emissions and adapting to climate change. As a result, national energy strategies are becoming more closely linked to international climate commitments [30] (p. 632). In this context, the compatibility of fossil

fuel-based development strategies with the long-term goals of the Paris Agreement remains a major topic of debate in both theoretical and empirical research.

The energy transition literature adds a socio-technical and political dimension to this debate. The multi-level perspective defines energy systems as regimes in which technologies, infrastructures, user practices, cultural meanings, market structures, and political-legal institutions are intertwined [31]. In this framework, low-carbon transitions depend on the strengthening of niche innovations such as renewable energy on the one hand, and the destabilization of fossil fuel regimes on the other. At this point, the literature on energy justice and just transition gains importance. Carley and Konisky [32] show that the transition to low-carbon energy will inevitably create winners and losers, and that processes such as job loss in fossil fuel-dependent regions, changes in energy prices, and the spatial redistribution of environmental burdens make the discussions of justice and inequality central. In this context, energy policies are now defined not only by the search for a balance between growth and emission targets, but also between social justice and regional inequalities. Designing transition policies for the workforce employed in fossil fuel sectors is critical to the political legitimacy of the energy transition. A recent synthesis of this literature extends the perspective to the pace of change itself, identifying tipping points, multi-system interactions, threshold dynamics, and deep leverage points as mechanisms that govern how quickly low-carbon transitions unfold [33].

The United States provides a particularly important case for understanding the relationship between energy, development, and climate policy. As one of the largest contributors to both historical and current greenhouse gas emissions, the country plays a central role in global climate governance. At the same time, the shale oil and shale gas revolution has transformed the United States into a major actor in international energy markets. Guliyev [9] examines the “America First” energy strategy within the context of the country’s emergence as a net oil exporter and the changing power dynamics of the global energy system. He argues that this strategy creates tensions with efforts to promote a low-carbon energy transition. Therefore, U.S. energy policy should be viewed not only through the lens of domestic economic objectives but also in terms of its broader implications for international politics, global energy markets, and climate diplomacy.

Because the concept of “energy dominance” occupies a central place in this study, its meaning requires clarification, particularly in relation to the older and more established concept of energy security. In the academic literature, energy security is most commonly defined as the low vulnerability of vital energy systems, traditionally elaborated through the dimensions of availability, accessibility, affordability, and acceptability [34]. It is, in essence, a defensive concept: it concerns protecting the national economy against supply disruptions and price shocks. Energy dominance, by contrast, emerged in 2017 as a programmatic term of the Trump administration and marks a deliberate offensive turn. As Schneider and Peebles [35] (p. 6–7) show in their analysis of the concept’s rhetoric, energy dominance reframes energy policy from securing supply toward projecting economic and geopolitical power through the expansion of production and exports; in later work they characterize it as a covenant-like promise that binds national greatness to fossil fuel abundance [36]. In analytical terms, the shift from energy security to energy dominance can thus be summarized as a move from a defensive posture (reducing vulnerability) to an offensive one (leveraging surplus), from import-substitution logic to export-promotion logic, and from risk management to power projection [9,36]. This conceptual distinction matters for the analysis that follows, because the two concepts imply different success criteria: energy security is satisfied by reliability and affordability, whereas energy dominance requires continuously expanding production and market share—an objective that structurally collides with decarbonization.

The contrast between the Obama and Trump administrations provides a clear example of how different political approaches can shape energy and climate policy. During the Obama presidency, climate change was treated as a major policy priority, and efforts were made to support the transition to a low-carbon economy

through measures such as the Clean Power Plan, stricter vehicle emission standards, and incentives for renewable energy development. The United States also played a leading role in the negotiations that resulted in the Paris Agreement and submitted its first Nationally Determined Contribution (NDC) as part of its commitment to reducing greenhouse gas emissions. In contrast, the Trump administration sought to reverse many of these policies after taking office. Guided by the principles of the “America First Energy Plan” and “energy dominance,” it pursued a strategy focused on reducing environmental regulations and expanding fossil fuel production [37].

Klass [11] explores the ways in which the Trump administration influenced energy transition processes by examining regulatory changes in areas such as electricity generation, transportation, energy development on public lands, and infrastructure approval procedures between 2016 and 2020. Similarly, Yozwiak et al. [12] analyze the eighty-four energy policy reversals introduced during the Trump presidency and find that many of these measures had only limited practical effects because of legal challenges and policy responses at the state level. Nevertheless, these actions were accompanied by heightened policy uncertainty and revealed weaknesses in the governance framework. Although the federal government generally pursued a fossil fuel-oriented agenda, many states and local governments continued to implement climate policies consistent with the goals of the Paris Agreement. This situation highlighted the complex and multi-layered nature of energy and climate governance in the United States [38] (p. 535), [39].

The literature points to three key conclusions regarding the relationship between energy, development, and climate. First, although the connection between energy consumption and economic growth varies across countries and periods, economic expansion based on fossil fuel-intensive production is generally associated with higher emissions. As a result, development strategies centered on fossil fuels often face tensions with climate objectives. Second, both the sustainable development framework and the Paris Agreement emphasize the need to align national energy policies with long-term emission reduction goals and just transition principles. This requires policymakers to balance short-term economic benefits, such as growth and employment, with longer-term environmental and climate-related challenges. Third, energy transition should not be understood solely as a technological or economic process. It is also shaped by institutional structures, political decisions, and the distribution of costs and benefits among different social and economic actors [31,32].

This study builds on the theoretical framework outlined above to examine the fossil fuel-oriented energy policies implemented during the Trump administration. Drawing from the energy-growth literature, it evaluates the assumptions behind policy arguments that emphasized economic growth, job creation, and energy production. It also considers how these policies were expected to influence broader development outcomes. In addition, the study uses insights from the sustainable development and climate governance literature to assess the possible implications of the energy dominance agenda for emissions, renewable energy investments, and policy stability. In this respect, the U.S. case serves as a useful example for understanding the trade-offs between short-term economic benefits and long-term sustainability concerns, while also offering policy lessons for energy-hub countries and developing economies. The theoretical tensions identified in this section—between the growth hypothesis and the conservation hypothesis, between fossil fuel-based expansion and carbon lock-in, and between defensive energy security and offensive energy dominance—do not remain abstract: as the following sections demonstrate, Trump-era policies gave each of these tensions a concrete institutional form, first in the design of the policies themselves (Section 4) and then in their implications for development dynamics (Section 5).

3 Data and Methodology

This study employs a qualitative, theory-driven research design that combines systematic document analysis with descriptive statistical evidence. It is explicitly conceived as a mechanism-based analysis rather than a causal-inference study: its purpose is to reconstruct the assumptions, instruments, and expected transmission channels of Trump-era energy policy and to confront them with observable trends, not to estimate the causal effect of any individual policy.

3.1 Study Period and Document Corpus

The study period covers the first Trump administration, from 20 January 2017 to 20 January 2021. For the quantitative indicators, the observation window is extended back to 2013 in order to provide a pre-2017 baseline—the years of the second Obama administration—against which developments during the administration can be assessed. The document corpus consists of three clearly distinguished categories of sources. The first category comprises primary policy documents produced by the administration itself: presidential executive orders published in the Federal Register, most importantly Executive Order 13783 [40]; agency documents issued in its implementation, such as the U.S. Environmental Protection Agency's (EPA) final report on regulatory review [41]; the official withdrawal statement on the Paris Agreement [42]; and the White House "Energy & Environment" policy pages preserved in the presidential archive [10]. The second category comprises contemporaneous assessments published between 2017 and 2021 by research organizations and systematic policy trackers, including the World Resources Institute's early rollback timeline [43], the Sabin Center's climate litigation review [44], the Rhodium Group's emissions impact estimates [45], and the joint New York Times–Harvard Law School inventory of regulatory rollbacks [46]. The third category comprises peer-reviewed academic literature, including retrospective analyses published after the end of the study period. Retrospective sources, including those published from 2021 onward, are used exclusively for interpretation and contextualization; all descriptive claims about what the administration did rest on primary documents and contemporaneous trackers, and the text distinguishes throughout between the administration's stated objectives, theoretically expected effects, and empirically observed outcomes.

3.2 Selection Criteria for Policy Actions

The inventory of regulatory actions analyzed in Section 4 was constructed from two systematic compilations: the New York Times–Harvard Law School tracker, which documents more than one hundred environmental rules that were reversed or weakened during the administration [46], and the dataset of 84 energy policy reversals assembled by Yozwiak et al. [12]. From these compilations, actions were included if they (i) were initiated at the federal level between January 2017 and January 2021, (ii) directly concerned energy production, energy infrastructure, or climate-relevant environmental regulation, and (iii) took a legally identifiable form (executive order, final or proposed rule, formal guidance, or treaty action). Actions of a purely procedural or minor administrative character were excluded. The resulting inventory does not claim to be exhaustive; it is designed to capture the major policy actions that define the administration's energy and climate agenda, grouped by policy area and mapped onto the three instrument categories developed in Section 4.

3.3 Quantitative Indicators

The descriptive indicators reported in Section 5 were compiled from official and industry-standard statistical sources: energy production, trade, electricity generation, prices, and energy-related CO₂ emissions from the U.S. Energy Information Administration's Monthly Energy Review and associated data series [47,48]; sectoral employment from the U.S. Bureau of Labor Statistics' Current Employment Statistics

survey, using the annual averages of monthly series for oil and gas extraction, coal mining, and support activities for mining [49]; and clean energy investment from BloombergNEF's (BNEF) energy transition investment data [50]. All values are reported as published by the source, and annual averages calculated from monthly series are identified as such. In addition to annual levels, Section 5.3 reports average annual changes for the sub-periods 2013–2016 and 2016–2019 and the single-year change in the pandemic year 2020, computed from the same series; these are descriptive contrasts between periods, not estimates of policy effects. These indicators serve a descriptive purpose only. The developments they document may reflect pre-existing market trends—most notably the shale revolution and sustained low natural gas prices—technological change, state-level policies, and, in 2020, the COVID-19 pandemic; accordingly, no causal effect of federal policy is inferred from them.

3.4 Analytical Strategy

The analysis proceeds in three steps. First, the discursive framing of energy policy is reconstructed from the primary documents in order to identify how development was defined and legitimized (Section 4). Second, the policy instruments are classified into three categories—promotion of fossil fuel production and infrastructure, withdrawal or weakening of climate and environmental regulation, and acceleration of permitting and review procedures—and their institutional consequences are traced (Section 4). Third, three theoretically derived causal mechanisms connecting these instruments to development outcomes—investment and production signals, regulatory cost reduction, and international decoupling—are specified in explicit chain form and evaluated against the descriptive evidence and the secondary literature (Section 5). This mechanism-based procedure, which follows the logic of theory-driven process tracing, allows structured statements about how policies could plausibly affect development dynamics while remaining agnostic about effect sizes, and it generates hypotheses that subsequent quantitative research can test formally—for instance, through interrupted time-series or difference-in-differences designs built around the January 2017 policy break, which lie beyond the scope of this study.

4 Trump-Era Energy Policies: Institutional Transformation, Discourse, and Policy Tools

During the Trump administration, energy policy became a central component of the broader “America First” agenda. The administration focused on expanding fossil fuel production, reducing regulatory restrictions, and strengthening the United States’ position in global energy markets. This approach differed substantially from the energy and climate policies pursued during the Obama years, which placed greater emphasis on renewable energy development and climate commitments. According to Vakhshouri [37], the “America First Energy Plan” was built around the objectives of increasing domestic energy production, lowering energy costs, and creating jobs, while giving less priority to environmental protection and climate-related concerns.

The “America First Energy Plan” and the concept of “energy dominance” expanded the role of energy policy beyond domestic economic management and positioned it as an important instrument of foreign policy. Energy policies can influence not only production and investment decisions but also international trade relations, geopolitical strategies, and regional power dynamics [51] (p. 803). The plan was largely built around three objectives: increasing domestic fossil fuel production to strengthen energy independence, supporting the struggling coal industry, and reversing key climate policies introduced during the Obama administration, particularly the Clean Power Plan and the Climate Action Plan [37]. This policy orientation was reflected in Trump’s public speeches, where he frequently used expressions such as “unleashing the full power of American energy” and pledged to remove what he described as “job-killing restrictions” on shale oil,

natural gas, and coal. Such statements illustrate how energy policy was closely associated with deregulation and support for fossil fuel industries.

This policy discourse also changed the meaning of energy independence. During the Obama administration, energy independence was generally discussed alongside energy efficiency, renewable energy development, and climate objectives. Under Trump, however, the concept shifted toward “energy dominance,” emphasizing the United States’ ability to become a major energy exporter and strengthen its position in global energy markets—the offensive reframing of energy security discussed in [Section 2](#). According to Guliyevev [9], the “America First” energy strategy represented a new geopolitical approach that sought to use the production surplus generated by the shale oil revolution as a foreign policy asset, particularly through increased exports of oil and liquefied natural gas (LNG). As a result, energy policy was linked not only to domestic goals such as economic growth and job creation but also to broader geopolitical ambitions and international influence.

The official justification for this approach can be seen in the Trump White House’s “Energy & Environment” reports. These reports present the United States’ rise to become the world’s leading producer of oil and natural gas, its achievement of net energy exporter status for the first time in nearly seven decades, and the expansion of LNG export capacity as evidence of the success of the administration’s energy agenda. The same sources also highlight a number of policy actions designed to promote domestic energy production, including the repeal of the Clean Power Plan and its replacement with the Affordable Clean Energy (ACE) rule, the approval of the Keystone XL and Dakota Access pipelines, the opening of the Arctic National Wildlife Refuge (ANWR) to oil and gas exploration, the removal of the federal coal leasing moratorium, and the acceleration of LNG export approvals. According to the administration, these measures were intended to unlock America’s energy potential and strengthen the country’s energy sector [10].

This shift in discourse was translated into policy through a series of presidential executive orders that expanded the authority of the executive branch in energy-related matters. One of the most significant measures was Executive Order 13783, issued on 28 March 2017, under the title “Promoting Energy Independence and Economic Growth” [40]. The order directed federal agencies to identify regulations that could be considered obstacles to energy production and to review existing policies that might slow investment and development in the energy sector. It emphasized the importance of developing the nation’s energy resources in a secure and economically beneficial manner while reducing regulatory requirements viewed as barriers to growth and job creation. Following this directive, agencies such as the EPA, the Department of the Interior, and the Federal Energy Regulatory Commission (FERC) reassessed a range of regulations, resulting in the modification or removal of several rules affecting fossil fuel production [41].

The decision to withdraw from the Paris Agreement was rooted in the same policy narrative. In his Rose Garden speech on 01 June 2017, President Trump argued that the agreement placed an unfair burden on the United States, claiming that it would harm American workers, increase costs for taxpayers, and contribute to job losses and industrial decline. He presented withdrawal from the agreement as a necessary step to protect the economic interests and well-being of American citizens [42]. However, Ward and Bowen [13] challenge the economic rationale behind this decision. Their analysis suggests that the administration’s cost assessments largely ignored the potential benefits of climate action and underestimated the social costs associated with carbon emissions. As a result, they argue that the decision to leave the Paris Agreement was difficult to justify from the perspective of the United States’ long-term economic and societal interests.

Another important aspect of institutional change during the Trump administration was the reorganization of leadership within key environmental and energy agencies. Several individuals who were critical of mainstream climate science or opposed to existing environmental regulations were appointed to senior positions in agencies such as the EPA and the Department of the Interior. At the same time, changes

were made to scientific advisory boards, and funding for climate- and environment-related programs was reduced. According to the literature, these developments reflected a broader effort to limit the role of federal institutions in environmental governance [11]. Klass [11] argues that the Trump Administration relied primarily on executive authority and existing administrative mechanisms to reshape energy policy, using presidential powers and regulatory changes to slow the pace of the energy transition rather than pursuing major legislative reforms through Congress.

One of the most visible outcomes of this approach was the large-scale rollback of environmental and energy regulations. According to reports prepared by the New York Times and Harvard Law School, more than one hundred federal regulations related to climate policy, air and water quality, public lands, and wildlife protection were either repealed or weakened between 2017 and 2021 [46]. Research conducted by Harvard's Environmental and Energy Law Program (EELP) indicates that regulations aimed at promoting clean energy and reducing emissions from fossil fuels were among the primary targets of these policy changes. In their analysis of 84 energy policy reversals implemented between 2017 and 2020, Yozwiak et al. [12] find that most of these measures were introduced through executive actions, agency directives, and regulatory revisions rather than through congressional legislation. They also note that many of these policy changes faced legal challenges and were partially constrained by decisions of state and federal courts.

From a policy standpoint, Trump-era energy policies can be grouped into three main areas: promoting fossil fuel production and infrastructure, reducing or removing environmental and climate regulations, and speeding up energy development projects through simplified permitting and review procedures. The major regulatory actions in each of these areas, together with their status at the end of the term and the legal challenges they attracted, are consolidated in Table 1.

Table 1: Major energy and climate regulatory actions of the first Trump administration, by policy area.

Policy Area	Specific Measure	Status at End of Term (January 2021)	Legal Challenges and Subsequent Developments
International climate policy	Withdrawal from the Paris Agreement (announced June 2017; effective November 2020)	Completed	No domestic litigation; the United States rejoined the agreement in February 2021
Power sector	Repeal of the Clean Power Plan and adoption of the Affordable Clean Energy (ACE) rule (2019)	Finalized	Challenged by states and environmental groups; the ACE rule was vacated by the D.C. Circuit in January 2021
Transportation	SAFE Vehicles Rule Part One: withdrawal of California's Clean Air Act waiver (2019)	Finalized	Challenged by California together with 23 other states and cities; the waiver was reinstated in March 2022
Transportation	SAFE Vehicles Rule Part Two: weakening of federal fuel-economy and greenhouse gas standards (2020)	Finalized	Multi-state and NGO litigation pending at the end of the term; the standards were subsequently revised
Methane regulation	Rescission of EPA methane standards for new oil and gas sources and rollback of the Bureau of Land Management (BLM) waste prevention rule (2020)	Finalized	Subject to litigation; the EPA rescission was reversed by Congress under the Congressional Review Act in June 2021

(Continued)

Table 1 (continued)

Policy Area	Specific Measure	Status at End of Term (January 2021)	Legal Challenges and Subsequent Developments
Water protection	Navigable Waters Protection Rule narrowing the definition of “waters of the United States” (WOTUS) (2020)	Finalized	Vacated by a federal district court in August 2021
Environmental review	Council on Environmental Quality rule narrowing the scope of review under the National Environmental Policy Act (NEPA), including the treatment of climate effects (2020)	Finalized	Subject to litigation; subsequently revised
Public lands	Lifting of the federal coal leasing moratorium (2017); oil and gas leasing program for the Arctic National Wildlife Refuge (ANWR) (2020–2021)	Implemented; first ANWR lease sale held in January 2021	Subject to litigation; the ANWR leases were subsequently suspended
Energy infrastructure	Presidential permit for the Keystone XL pipeline and support for completion of the Dakota Access pipeline (2017)	Approved	Continuing litigation; the Keystone XL permit was revoked in January 2021
Offshore energy	“America-First Offshore Energy Strategy” expanding offshore oil and gas leasing plans (2017)	Proposed and partially implemented	Arctic and Atlantic provisions blocked by a federal court in 2019

Note: Compiled by the authors from the systematic rollback inventories of the New York Times–Harvard Law School tracker [46], the energy policy reversal dataset of Yozwiak et al. [12], the regulatory analyses of Klass [11], and, for the California waiver, the California Air Resources Board’s documentation [52]. Status descriptions refer to the end of the first term (January 2021); later judicial and administrative developments are noted for context. Abbreviations: ACE, Affordable Clean Energy (rule); ANWR, Arctic National Wildlife Refuge; BLM, Bureau of Land Management; EPA, U.S. Environmental Protection Agency; NEPA, National Environmental Policy Act; NGO, non-governmental organization; SAFE, Safer Affordable Fuel-Efficient (Vehicles Rule); WOTUS, waters of the United States.

The first category comprises the production- and infrastructure-promoting measures collected in the upper rows of [Table 1](#): pipeline permits, expanded leasing on public lands and offshore, and the reopening of federal coal leasing. According to Vakhshouri [37], these policies were presented as tools for stimulating economic activity and creating jobs by lowering energy production costs. However, the author argues that their ability to revive the coal industry was limited, since the sector’s long-term decline was driven largely by market conditions, particularly the growing competitiveness of natural gas and renewable energy sources.

The second area of policy change involved the weakening of climate and environmental regulations. The principal measures—spanning the power sector, vehicle standards, methane controls, water protection, and environmental review under the National Environmental Policy Act (NEPA)—are itemized in [Table 1](#) and are not restated here. These measures reflected the administration’s broader effort to reduce regulatory requirements on energy producers and industrial sectors. According to an assessment by the Rhodium Group, the cumulative effect of these climate policy rollbacks could result in an additional 1.8 gigatons (Gt) of CO₂-equivalent emissions through 2035 if fully implemented—an amount equivalent to nearly one-third of total U.S. emissions in 2019 [45]. Notably, this estimate covers the vehicle, methane, and hydrofluorocarbon rollbacks and excludes the repeal of the Clean Power Plan, whose implementation pathway was considered too uncertain to quantify [45].

The third major area of policy change involved efforts to speed up the approval and implementation of energy projects. Executive Order 13783 and related presidential directives encouraged federal agencies to streamline environmental review procedures, reduce administrative delays, and improve coordination among agencies involved in permitting processes [40]. The objective was to accelerate investment and infrastructure development in the energy sector. Early assessments by the World Resources Institute (WRI), covering the administration's first 100 days, and by Columbia University's Sabin Center suggest that these measures reduced regulatory uncertainty for projects such as pipelines, LNG export terminals, and oil, gas, and coal developments. However, they also raised concerns that faster approval procedures could limit the thorough evaluation of environmental and social impacts associated with these projects [43,44].

Taken together, these policy measures produced two important institutional consequences. First, they reduced the capacity of federal institutions to address environmental and climate-related issues. Studies conducted by Harvard's EELP indicate that the role of the EPA was weakened not only in terms of regulatory authority but also in areas such as scientific research, data collection, monitoring, and enforcement. According to Klass [11], these changes weakened the institutional foundations of climate governance and created challenges for future regulatory efforts.

Second, the policy changes contributed to a more fragmented system of governance between federal and state authorities. While the federal government moved away from several climate-related commitments, many states and cities continued to pursue policies consistent with the goals of the Paris Agreement and, in some cases, strengthened their own climate initiatives. Although this multi-level governance structure helped limit some of the environmental impacts of federal policy changes, it also created a more complex regulatory environment and increased uncertainty for investors and policymakers [12,38].

Overall, the energy policies implemented during the Trump administration reflected a coherent strategy centered on expanding fossil fuel production and reducing regulatory constraints. However, the broader implications of this strategy for sustainable development and institutional resilience remain contested. On the one hand, rising oil and natural gas production, the achievement of net energy exporter status, and employment gains in some energy-producing regions were frequently cited as evidence of the success of the energy dominance agenda. On the other hand, the weakening of climate and environmental regulations raised concerns about higher emissions, increased environmental and public health risks, and greater uncertainty surrounding long-term investments in clean energy technologies [13,45]. Having established in this section what the policies were—their discourse, their instruments, and their institutional footprint—the analysis now turns to what these policies imply: [Section 5](#) traces the mechanisms through which this policy set could affect development dynamics and confronts its stated objectives with the observable record.

5 The Impact of Trump-Era Energy Policies on Development Dynamics

5.1 *Energy Dominance as a Development Narrative*

A theoretical assessment of the relationship between Trump-era energy policies and development begins with the question of how development is achieved and what trade-offs accompany it. During this period, the concept of energy dominance functioned as more than an energy strategy; it served as a broader political narrative linking energy policy to economic growth, national strength, and international influence. Rather than focusing solely on energy security or reducing import dependence, the administration promoted energy production as a means of enhancing the United States' position in global energy markets and strengthening its geopolitical influence [35] (p. 6–7). Within this perspective, development was associated with lower energy costs, expanded fossil fuel production, and increased export capacity. At the same time, indicators such as economic competitiveness, employment, and growth were frequently used to justify policies that

placed less emphasis on environmental and social costs, including the externalities associated with fossil fuel consumption.

A key theoretical issue raised by this approach is the tension between short-term economic objectives and the long-term transformation required to address climate change. Central to this tension is carbon lock-in as defined in [Section 2](#): the self-reinforcing inertia produced by the interaction of infrastructural, institutional, and behavioral dependencies on carbon-intensive energy systems [26] (p. 426–427). Because these dimensions reinforce one another, progress in one area may be slowed or offset by resistance in others. From this perspective, the Trump administration's emphasis on expanding fossil fuel production and reducing regulatory costs may have supported short-term economic goals, but the mechanisms traced in [Section 5.2](#) suggest that it also strengthened conditions that could prolong dependence on carbon-intensive development pathways.

5.2 Policy Instruments and Causal Mechanisms

From a theoretical perspective, it is possible to analyze the effects of policies by focusing on the mechanisms through which they operate, even in the absence of direct quantitative measurement. During the Trump administration, a series of policy actions—including the weakening of climate and environmental regulations, the acceleration of approval processes for fossil fuel projects, and the scaling back of institutional support for energy efficiency and emission reduction programs—were presented as measures to encourage investment and reduce costs for businesses. According to the Sabin Center's assessment of the administration's first year, policy priorities included delaying greenhouse gas regulations, expanding opportunities for fossil fuel development, including in previously protected areas, postponing energy-efficiency standards, and reducing the role of climate considerations in environmental reviews [44]. Taken together, these measures reflected a development strategy that emphasized increased fossil fuel production while reducing the scope of regulatory oversight. Three causal mechanisms, each of which can be stated as an explicit chain running from policy action to development outcome, connect this strategy to development dynamics.

The first mechanism operates through investment and production signals. Faster permitting procedures and expanded access to public lands for fossil fuel projects could increase confidence within the energy sector, particularly in the short term, by creating a more predictable investment environment. However, these signals were not purely economic; they also conveyed political priorities and shaped expectations about the future direction of energy policy. The energy sources favored by the state often influence where capital is invested and which technologies receive long-term support. The literature on carbon lock-in highlights the importance of this issue. Large-scale infrastructure investments create long-lasting financial commitments and institutional dependencies that can make future transitions more costly and difficult [26] (p. 429–431). Therefore, while a fossil fuel-oriented development strategy may support short-term economic growth, it can also reduce flexibility and limit opportunities for future energy transformation. In schematic form, the mechanism runs: designation of fossil fuels as strategically favored (A) → lower regulatory and permitting costs and expanded resource access (B) → redirection of capital toward long-lived, carbon-intensive assets (C) → strengthened carbon lock-in and higher future transition costs (D). The supporting evidence is the permitting and leasing record summarized in [Table 1](#); the principal boundary condition is that investors must perceive the policy signal as durable—where legal challenges and the prospect of administrative reversal made durability doubtful, as was frequently the case [12], the chain weakened at its first link.

The second mechanism operates through the reduction of regulatory costs. Relaxing environmental and climate regulations can lower compliance expenses for businesses and reduce short-term operational burdens. However, from a theoretical perspective, these apparent savings may represent a shift of costs from private actors to society as a whole and to future generations. Another important issue is that frequent

regulatory changes can weaken institutional stability and create uncertainty. Regulatory rollbacks often face legal challenges, judicial review, and procedural disputes, making their long-term outcomes less predictable. Adler [44] documents the large number of lawsuits and legal objections directed at climate-related policy reversals during the Trump administration, showing that these measures frequently encountered institutional resistance. In schematic form: withdrawal or weakening of regulation (A) → reduced private compliance costs and improved short-term profitability (B) → externalization of environmental and health costs onto society and future periods (C) → contested legitimacy, litigation, and regulatory instability (D). The supporting evidence is the litigation record documented by the Sabin Center [44] and the judicial reversals noted in Table 1; the boundary condition is that cost reduction yields a net development gain only if the private savings exceed the social costs shifted onto others—an assumption contradicted by analyses of the social cost of carbon underlying the administration’s own withdrawal arguments [13]. As a result, policies designed to accelerate economic activity may also generate governance challenges and increase policy uncertainty over time.

The third mechanism relates to the weakening of alignment with the international climate regime. Under the Paris Agreement framework, countries are expected not only to reduce emissions but also to provide long-term policy direction and credible commitments that guide investment decisions. When national governments step back from these commitments, other actors may become more active in climate governance. In the United States, the Trump administration’s decision to withdraw from the Paris Agreement encouraged many states and cities to strengthen their own climate initiatives. As Galbraith [53] (p. 274–275) notes, several sub-national governments developed climate commitments and international partnerships aimed at maintaining progress toward the goals of the Paris Agreement. Although these efforts could not fully offset the effects of federal policy changes, they demonstrated that climate governance increasingly involves multiple actors operating at different levels rather than being driven solely by national governments. In schematic form: federal retreat from the international climate architecture (A) → weakened credibility of national commitments and diminished investment guidance (B) → compensatory mobilization by sub-national and private actors (C) → fragmented, multi-actor climate governance with higher coordination costs and partial offsetting of federal policy (D). The supporting evidence is the sub-national mobilization documented in Section 5.5; the boundary condition is that sub-national compensation is inherently partial—it can blunt, but not replace, federal direction [53].

5.3 Descriptive Evidence: Energy and Development Indicators, 2013–2020

The mechanisms specified above generate expectations that can be confronted with the observable record. Tables 2 and 3 assemble descriptive indicators for the period 2013–2020, using 2013–2016 as a pre-administration baseline. Three features of the record deserve emphasis; in line with the methodological position set out in Section 3, they are reported as descriptive observations rather than causal effects.

First, the production and trade records that the administration presented as achievements are real but rest on trajectories that predate 2017. Crude oil production rose from 8.9 million barrels per day in 2016 to a record 12.3 million in 2019, dry natural gas production increased by roughly 27% over the same period, LNG exports grew nearly tenfold by 2019 and more than twelvefold by 2020, and in 2019 the United States became a net exporter of primary energy for the first time in 67 years (Table 2) [48]. Yet, as Table 2 also shows, production had already been expanding strongly between 2013 and 2016 on the strength of the shale revolution, and the acceleration after 2017 coincided with a recovery of world oil prices from their 2015–2016 trough rather than with any single regulatory change. Coal is the clearest counterexample to the policy narrative: despite the lifting of the leasing moratorium and the repeal of the Clean Power Plan, coal production fell from 728 million short tons in 2016 to 535 million in 2020, and coal’s share of electricity

generation declined from 30.4% to 19.3% (Tables 2 and 3), driven by sustained low natural gas prices and the falling cost of renewables [11,37].

Table 2: U.S. energy production, trade, and price indicators, 2013–2020.

Indicator	2013	2016	2017	2018	2019	2020
Crude oil production (thousand barrels per day)	7495	8852	9361	10,953	12,315	11,336
Dry natural gas production (billion cubic feet)	24,206	26,592	27,341	30,774	33,899	33,811
Coal production (million short tons)	984.8	728.4	774.6	756.2	706.3	535.4
LNG exports (billion cubic feet)	3	187	708	1083	1820	2390
Net primary energy imports (quadrillion Btu)*	12.8	11.3	7.5	3.6	−0.6	−3.5
WTI crude oil spot price (US\$ per barrel, annual average)	97.98	43.29	50.80	65.23	56.99	39.16
Henry Hub natural gas spot price (US\$ per million Btu, annual average)	3.73	2.52	2.99	3.15	2.56	2.03

Note: *Negative values denote net exports. Source: compiled by the authors from the U.S. Energy Information Administration's Monthly Energy Review and associated EIA data series [47,48]. Abbreviations: Btu, British thermal unit; EIA, U.S. Energy Information Administration; LNG, liquefied natural gas; WTI, West Texas Intermediate.

Table 3: U.S. fossil fuel employment, electricity mix, and energy-related CO₂ emissions, 2013–2020.

Indicator	2013	2016	2017	2018	2019	2020
Employment, oil and gas extraction (thousands, annual average)	193.4	169.8	143.8	142.1	143.5	129.9
Employment, support activities for mining (thousands, annual average)	407.7	266.2	296.0	343.8	344.0	246.6
Employment, coal mining (thousands, annual average)	78.1	50.7	51.5	51.6	50.5	39.8
Coal share of electricity generation (%)	38.9	30.4	29.9	27.5	23.4	19.3
Renewable share of electricity generation, including hydropower (%)	12.8	14.9	17.0	16.9	17.6	19.5
Wind and solar electricity generation (terawatt-hours)	177	263	308	337	368	427
Energy-related CO ₂ emissions (million metric tons)	5359	5169	5131	5278	5147	4585

Note: Employment figures are annual averages of monthly, seasonally adjusted series from the BLS Current Employment Statistics survey [49]; electricity generation shares and emissions are calculated from the EIA Monthly Energy Review [47]. Abbreviations: BLS, U.S. Bureau of Labor Statistics; EIA, U.S. Energy Information Administration.

Second, the employment record provides at best partial support for the job creation claims that were central to the administration's development framing. Employment in oil and gas extraction declined from an annual average of 169,800 in 2016 to 143,500 in 2019, far below the 2013–2014 average of more than 193,000 (Table 3). The clearest gains occurred in support activities for mining, which rose from 266,200 in 2016 to 344,000 in 2019 with the recovery in drilling activity, while coal mining employment remained essentially flat

at around 51,000 between 2017 and 2019 before falling to 39,800 in 2020. Taken together, the three fossil fuel-related segments employed roughly 538,000 workers in 2019, about 51,000 more than in 2016 but well below the levels of the early 2010s, and the sector ended the administration's term, in 2020, with substantially fewer jobs than at its start (Table 3) [49]. The “energy jobs” promise thus materialized only as a partial, price-driven recovery from the 2016 trough—not as a structural reversal of the sector's employment decline.

Third, the clean energy and emissions record moved largely against the direction of federal policy. The renewable share of electricity generation rose from 14.9% in 2016 to 19.5% in 2020, and wind and solar generation increased by more than 60% over the administration's term (Table 3). Energy-related CO₂ emissions were roughly flat between 2016 and 2019 and then fell by about 11% in 2020, a decline attributable primarily to the COVID-19 pandemic rather than to policy (Table 3). Investment tells a more cautionary story: according to BNEF, U.S. energy transition investment declined by 11% in 2020 to US\$85.3 billion—implying a 2019 level of roughly US\$96 billion—with renewable energy capacity investment falling 20% to US\$49.3 billion, even as European investment rose by 67% to US\$166.2 billion and global investment reached US\$501.3 billion in the same year [50]—a divergence consistent with the policy uncertainty channel identified in Section 5.2, though not attributable to it alone.

These observations must be read against several confounding factors, in line with the methodological cautions of Section 3. The expansion of oil and gas output reflects the technological momentum of the shale revolution, which predates the administration; the fortunes of coal were determined primarily by relative fuel prices, with Henry Hub natural gas prices remaining at or below US\$3.15 per million Btu throughout the administration's term (Table 2); state-level policies continued to drive renewable deployment independently of federal policy [39]; and the year 2020 is dominated by the COVID-19 demand shock, which depressed production, employment, prices, and emissions simultaneously. For these reasons, the record summarized here serves to discipline the policy narrative—showing which stated objectives did and did not materialize—rather than to attribute outcomes causally to the administration's policies.

These cautions can be given sharper descriptive content by comparing rates of change across sub-periods rather than end-point levels alone. Table 4 reports average annual changes in the principal production, electricity-mix, emissions, and employment indicators for the pre-administration years (2013–2016) and the pre-pandemic administration years (2016–2019), with the pandemic year 2020 shown separately. Three contrasts stand out. Hydrocarbon expansion accelerated: crude oil output grew roughly two and a half times faster, and dry natural gas output roughly three times faster, in 2016–2019 than in 2013–2016. The decline of coal and of emissions slowed: coal production, which had contracted by an average of 85.5 million short tons per year in 2013–2016, fell by only 7.4 million short tons per year in 2016–2019, and the decline in energy-related CO₂ emissions nearly stalled, from about 63 to about 7 million metric tons per year. The renewable share of electricity generation, by contrast, continued to expand at a pace close to—indeed slightly above—its pre-2017 trend. Because 2013–2016 corresponds to the second Obama administration, these contrasts also supply the comparison with the preceding administration that the study period permits. They remain descriptive: given the confounders noted above, they measure how the record changed, not what caused the change. Their value lies in giving precise content to the interpretation developed in Section 5.4—during the pre-pandemic administration years, decarbonization momentum slowed even as the transition's direction persisted.

5.4 Energy Dominance versus Sustainable Development: Three Dimensions of Tension

The juxtaposition of the policy record (Section 4) with the descriptive evidence (Section 5.3) brings the inherent contradiction between the energy dominance agenda and sustainable development into sharper focus. This contradiction can be specified along three dimensions.

Table 4: Average annual changes in selected U.S. energy, emissions, and employment indicators by sub-period, 2013–2020.

Indicator	Average Annual Change, 2013–2016	Average Annual Change, 2016–2019	Change, 2019–2020
Crude oil production (thousand barrels per day)	+452	+1154	−979
Dry natural gas production (billion cubic feet)	+795	+2436	−88
Coal production (million short tons)	−85.5	−7.4	−170.9
Wind and solar electricity generation (terawatt-hours)	+29	+35	+59
Coal share of electricity generation (percentage points)	−2.8	−2.3	−4.1
Renewable share of electricity generation (percentage points)	+0.7	+0.9	+1.9
Energy-related CO ₂ emissions (million metric tons)	−63	−7	−562
Employment, oil and gas extraction (thousands, annual average)	−7.9	−8.8	−13.6

Note: Entries are average annual changes computed from the annual series reported in [Tables 2](#) and [3](#) before rounding (end-year minus start-year value, divided by the number of intervening years); the final column is the single-year change from 2019 to 2020, shown separately because it is dominated by the COVID-19 demand shock. Changes in generation shares are expressed in percentage points. The 2013–2016 interval corresponds to the second Obama administration, the 2016–2019 interval to the pre-pandemic years of the first Trump administration. Source: Authors' calculations from EIA and BLS series [\[47–49\]](#). Abbreviations: BLS, U.S. Bureau of Labor Statistics; COVID-19, coronavirus disease 2019; EIA, U.S. Energy Information Administration.

The first dimension concerns goal logic. Energy dominance defines success volumetrically: more production, more exports, larger market share [\[9,36\]](#). Sustainable development, by contrast, defines success through the compatibility of present welfare with future capacity, which in the energy domain requires a declining emissions trajectory and a rising share of low-carbon sources [\[23,25\]](#). The two goal structures are not merely different but partially inverse: the indicator that counts as achievement under one framework—expanding hydrocarbon output—registers as increased committed emissions and lock-in risk under the other [\[26,27\]](#). [Table 5](#) maps this inversion onto the Sustainable Development Goals.

Table 5: Potential impact matrix of Trump-era energy policies on the sustainable development goals.

Policy Cluster	SDG 7 (Affordable and Clean Energy)	SDG 13 (Climate Action)	Other Related SDGs
Promotion of fossil fuel production and infrastructure	Mixed: supports energy affordability and supply security (target 7.1), but works against the renewable energy share target (7.2)	Negative: expands committed emissions and carbon lock-in risk	SDG 8: short-term, regionally concentrated income and employment gains; SDG 9: infrastructure investment channeled toward carbon-intensive assets
Withdrawal or weakening of climate and environmental regulation	Negative for the energy efficiency target (7.3); broadly neutral for access	Negative: estimated additional 1.8 Gt CO ₂ -equivalent of emissions through 2035	SDG 3: increased air pollution-related health risks; SDG 16: weakened regulatory institutions and enforcement capacity

(Continued)

Table 5 (continued)

Policy Cluster	SDG 7 (Affordable and Clean Energy)	SDG 13 (Climate Action)	Other Related SDGs
Acceleration of permitting and environmental review	Mixed: faster deployment of energy infrastructure, but reduced scrutiny of impacts	Negative: climate effects de-prioritized in project reviews	SDG 6 and SDG 15: reduced protection of water resources and ecosystems
Withdrawal from the Paris Agreement	Negative for clean energy investment signals (targets 7.2 and 7.a)	Negative: departure from the NDC architecture and weakened global mitigation cooperation	SDG 17: weakened international partnership and climate finance cooperation

Note: Qualitative assessment by the authors based on the mechanisms and evidence discussed in [Sections 4 and 5](#); the emissions estimate is from the Rhodium Group [45]. Entries indicate potential impact channels identified analytically, not measured outcomes. Abbreviations: NDC, Nationally Determined Contribution; SDG, Sustainable Development Goal.

The second dimension concerns time preference. The benefits claimed for the energy dominance agenda—lower energy costs, employment gains, export revenues—accrue in the short run and are politically visible, whereas its principal costs—committed emissions, foregone transition investment, institutional erosion—accumulate over decades and are politically diffuse. The mechanism analysis in [Section 5.2](#) shows how this asymmetry operates: investment signals and regulatory cost reductions deliver immediate private gains while shifting environmental, health, and adjustment costs onto future periods. In this sense, the administration's policy set embodied a strong implicit discount rate applied to future welfare, the defining feature of unsustainable development paths identified in the sustainability literature [8,23].

The third dimension concerns distributional effects. The gains of the fossil fuel-centered strategy were geographically and sectorally concentrated—accruing to producing regions and incumbent industries—while its costs were dispersed across society in the form of environmental and health risks, and concentrated in a different way on the communities most exposed to pollution and to the eventual transition [32,54]. The energy dominance narrative thus inverted the distributional logic of a just transition: rather than compensating the prospective losers of decarbonization while pursuing it, it delivered targeted benefits to incumbent constituencies while deferring—and thereby enlarging—the adjustment that fossil fuel-dependent regions will ultimately face ([Section 5.6](#)).

Against this background, a question posed by the record of the first term can be answered directly: did Trump-era policies fundamentally reverse the direction of the U.S. energy transition, or did they delay it? The evidence assembled in this study supports the delay interpretation, with an important qualification. The direction of structural change did not reverse: coal continued to decline, the renewable share of generation continued to rise, and the majority of regulatory rollbacks were blocked, vacated, or subsequently reversed through litigation and administrative change ([Table 1](#)) [11,12]. In this sense, countervailing market forces, state policies, and judicial review proved stronger than federal discourse. At the same time, the sub-period contrasts reported in [Table 4](#) show what delay meant in practice: between 2016 and 2019 the decline of energy-related CO₂ emissions nearly stalled and the contraction of coal output slowed sharply relative to 2013–2016, while renewable expansion continued at a broadly similar pace. The qualification is that delay is not costless: the term ended with clean energy investment declining while European investment surged ([Section 5.3](#)), an estimated 1.8 Gt of additional CO₂-equivalent emissions through 2035 had the finalized

rollbacks remained fully in effect [45], and an erosion of regulatory capacity and international credibility whose effects extend beyond the term itself (Section 5.8). Trump-era policies, in short, changed the speed and the cost of the transition rather than its direction—but in a domain governed by cumulative emissions and long-lived infrastructure, changes in speed are themselves consequential [26,27].

5.5 Multi-Level Governance and Institutional Constraints

At the same time, institutional constraints and the multi-level governance structure of the United States limited the extent to which federal energy policies could produce uniform outcomes. The interaction between federal and state authorities, the role of the courts in reviewing administrative decisions, and the presence of policymakers operating at different levels of government created a complex regulatory environment in both energy and climate policy. As Galbraith [53] (p. 276–277) points out, some states actively challenged federal policies through legal action, while others pursued climate agendas that differed from those of the federal government. As a result, the effects of Trump-era energy policies cannot be understood simply in terms of national success or failure. Instead, they should be viewed within a broader context of institutional competition, negotiation, and policy conflict among multiple actors [39]. Byrne et al. [55] place this pattern in a longer cycle of U.S. federal climate inaction, arguing that a polycentric counterpart—alliances of social movements with state and local governments—has emerged that designs and enforces policies exceeding federal ambition.

Two concrete episodes illustrate how this multi-level dynamic operated in practice and how it shaped corporate investment decisions. The first is the confrontation over vehicle emission standards. When the SAFE Vehicles Rule withdrew California's long-standing Clean Air Act waiver in 2019, California—joined by 23 other states and cities—challenged the action in federal court, and the waiver was ultimately reinstated in 2022 (Table 1). More revealing than the litigation itself was the behavior of firms: in July 2019, four major automakers—BMW, Ford, Honda, and Volkswagen, later joined by Volvo—concluded voluntary framework agreements with the California Air Resources Board (CARB), committing to annual fleet-efficiency improvements through model year 2026 that were stricter than the weakened federal standards [52]. Faced with a choice between a temporarily permissive federal rule and the prospect of durable, stricter state standards, a substantial segment of the industry chose to align its investment planning with the stricter trajectory—evidence that regulatory credibility, not merely regulatory laxity, guides corporate decisions. The second episode is the sub-national mobilization around the Paris Agreement. Within days of the announced withdrawal, more than 1200 governors, mayors, business leaders, investors, and university presidents signed the “We Are Still In” declaration, pledging to continue pursuing the agreement's goals [56], and this coalition subsequently institutionalized sub-national climate diplomacy of the kind analyzed by Galbraith [53]. Together, the two episodes substantiate the boundary condition attached to the third mechanism in Section 5.2: sub-national and private actors partially offset federal retreat, but at the price of a more fragmented and less predictable regulatory environment [38,39]. The wider literature on non- and sub-state climate action after Paris cautions that such mobilization is not straightforwardly compensatory: reviewing this facilitative regime, Marquardt et al. [57] identify substitution of state action, co-optation, tokenism, and depoliticization as risks built into it.

5.6 Just Transition and the Quality of Development

From the perspective of sustainable development, the main tension lies between a fossil fuel-based growth narrative and the need to reduce emissions and transform energy systems. The concept of carbon lock-in (Section 2) explains this problem not simply as a failure of environmental policy, but as a structural condition in which infrastructure, institutions, and social practices reinforce one another; short-term

economic incentives can thereby increase the long-term costs of transition by strengthening dependence on carbon-intensive systems [26] (p. 445–446). In this sense, the Trump era provides a useful case for questioning not only the scale of economic development but also its quality. It raises important questions about which types of energy systems can support sustainable growth and how the social and environmental costs of development should be distributed fairly.

The concept of a just transition provides an important complement to this discussion by introducing questions of fairness and governance into the relationship between energy, development, and climate policy. McCauley and Heffron [54] (p. 2–3) argue that a just transition should be understood not only in terms of employment outcomes but also through the principles of distributive justice, procedural justice, and restorative justice; subsequent work has emphasized that neglecting these dimensions can itself endanger climate targets by undermining the political sustainability of transition policies [58]. More recent work argues for a whole-systems approach that integrates procedural, distributive, recognition, and restorative dimensions rather than addressing transition justice sector by sector [59]. In this framework, attention is given to how the costs and benefits of energy transitions are shared, who participates in decision-making processes, and how historical social and environmental harms are addressed. During the Trump era, the fossil fuel-based development narrative gained support in many energy-producing regions by emphasizing job creation and local economic benefits. However, it offered few answers regarding how the social consequences of future energy transitions should be managed. For this reason, incorporating the concept of just transition into the evaluation of development outcomes provides a useful theoretical perspective, even in the absence of direct empirical measurement. It allows the discussion to move beyond economic indicators alone and consider broader questions of fairness, inclusion, and long-term sustainability.

5.7 Comparative Implications and the Turkish Case

From a comparative perspective, the U.S. experience suggests that increasing energy production and export capacity alone is not sufficient to achieve sustainable development. Long-term success also depends on maintaining institutional stability, remaining compatible with international commitments, and investing in future-oriented energy transitions. One of the main lessons for countries seeking to become energy hubs is the importance of designing policies that avoid reinforcing carbon lock-in through fossil fuel revenues and infrastructure investments. Instead, policy frameworks should support flexibility and facilitate future transitions toward lower-carbon energy systems [26] (p. 445–446). A parallel literature examines the same problem from the standpoint of fossil fuel-producing low- and lower-middle-income countries, distinguishing the energy, economic, and equitable production transitions that a carbon-constrained world imposes on them and stressing the need for context-specific international support [60].

The Turkish case merits separate treatment, because Türkiye occupies a structural position that is in several respects the mirror image of the United States, and the transferability of the U.S. lessons can be assessed along four dimensions. The first dimension is energy import dependence. Whereas the United States pursued dominance from a position of surplus, Türkiye imports approximately 93% of the oil and 99% of the natural gas it consumes [61]. An energy dominance strategy of the American type is therefore not available to Türkiye; its version of energy-based development runs instead through diversification, domestic renewable deployment—which empirical evidence shows reduces import dependence [62], and which input–output analysis for Türkiye estimates could lower energy import costs by US\$6.9–14.6 billion over ten years through a solar and wind investment programme, with net trade gains accruing over the plants’ operating lifetime [63]—and the aspiration to function as a regional energy trading hub, including through emerging green energy corridors [51,64]. The second dimension is carbon lock-in risk. In the United States, lock-in operates primarily through domestic extraction infrastructure; in Türkiye, it operates through

long-lived import infrastructure—pipelines, LNG terminals, and gas-fired capacity—and through domestic lignite-based generation. The lesson of Sections 5.1–5.4 applies with equal force: infrastructure decisions made for short-term supply security or affordability reasons can commit the country to carbon-intensive pathways for decades [26,27]. The third dimension is policy autonomy. The U.S. record shows how federalism, judicial review, and sub-national mobilization moderated federal policy swings (Section 5.5). Türkiye's more centralized administrative structure lacks equivalent institutional counterweights, which makes national energy policy more decisive but also more exposed to abrupt reversals; the stability-dependent investment mechanism identified in Section 5.2 therefore operates, if anything, more strongly in the Turkish context. The fourth dimension is external climate policy pressure. Unlike the United States, which under the first Trump administration could step outside the international climate architecture at limited immediate economic cost, Türkiye faces a binding external anchor in the European Green Deal: the EU's Carbon Border Adjustment Mechanism (CBAM) [65] directly affects the competitiveness of Türkiye's carbon-intensive exports to its largest trading partner, with model-based assessments indicating substantial potential output and export losses in the absence of domestic carbon pricing and industrial decarbonization [66]; in cross-country terms, Türkiye is among the EU trade partners most exposed to the mechanism in absolute terms [67]. Recent analysis suggests that the mechanism's principal external effect may lie less in averting emissions leakage than in accelerating the adoption of carbon pricing among EU trade partners [68]. Türkiye's ratification of the Paris Agreement in 2021 and its 2053 net-zero target [69] reflect, in part, this external pressure. For Türkiye, therefore, the cost calculus of delaying the energy transition is structurally different from the American one: delay does not merely defer adjustment costs, as in the U.S. case, but incurs immediate competitiveness penalties through trade [62,66].

5.8 Policy Continuity: The 2024 Campaign and the Second Trump Administration

Although this study's analytical window closes with the end of the first term in January 2021, the energy policy commitments of Trump's 2024 presidential campaign—and their rapid implementation after January 2025—provide a relevant comparative epilogue, because they test whether the first-term pattern was idiosyncratic or programmatic. The 2024 campaign, condensed into the slogan “drill, baby, drill” and codified in the Agenda 47 platform commitments, promised expanded fossil fuel production, lower energy prices, and the dismantling of the Biden administration's climate policies. On the first day of the second term, three executive orders translated these commitments into policy: Executive Order 14154, “Unleashing American Energy,” directing agencies to remove obstacles to fossil fuel development and suspending clean energy funding streams [70]; Executive Order 14156, declaring a national energy emergency to accelerate energy infrastructure development [71]; and Executive Order 14162, initiating a second withdrawal from the Paris Agreement [72]. The comparison with the first term reveals both continuity and escalation. The instruments are the same—executive orders, regulatory rollback, and treaty exit—confirming the administrative-presidency pattern identified by Klass [11]; but the second-term versions are more far-reaching, invoking emergency powers and targeting statutory clean energy programs rather than only regulations, and stepping back from international environmental cooperation more broadly than in 2017 [73]. For the mechanism analysis of this study, the recurrence matters in a specific way: a policy environment in which each change of administration reverses its predecessor's energy policy institutionalizes precisely the regulatory uncertainty identified in Section 5.2 as corrosive to long-horizon investment, and it deepens the credibility deficit in international commitments identified as the third mechanism. The second term thus corroborates, rather than merely repeats, the structural argument of this study.

6 Conclusion

This study has examined how U.S. energy policy was redefined during Donald Trump's first presidential term (2017–2021) and explored the implications of this shift within the broader energy–development–climate framework. The findings suggest that the energy dominance agenda strengthened a development narrative centered on short-term economic performance by promoting higher energy production, reducing regulatory constraints, and expanding export capacity. At the same time, this policy orientation raised concerns regarding climate commitments, the long-term stability of clean energy investments, and the environmental costs associated with increased fossil fuel dependence.

In the context of the research questions, the first finding is that development during the Trump era was largely defined through narratives of increased production, low-cost energy, and job creation. This definition was supported by executive actions and regulatory rollbacks granting broad discretionary powers to federal agencies, and facilitated the framing of energy policy as a geopolitical tool. The descriptive evidence assembled in [Section 5.3](#) disciplines this narrative: production and export records were real but continuous with pre-2017 trends, employment gains were partial and price-driven, and coal's decline continued despite targeted support. On the question of direction, the analysis concludes that Trump-era policies delayed rather than fundamentally reversed the U.S. energy transition—countervailing markets, states, and courts preserved the transition's direction even as the pace of decarbonization slowed ([Table 4](#))—but that the delay itself carried substantial costs in committed emissions, foregone investment, and institutional erosion ([Section 5.4](#)).

A second important finding is that policies such as withdrawing from the Paris Agreement and weakening climate regulations may reduce regulatory burdens in the short term, but they can also create long-term challenges for sustainable development. As countries face increasing pressure to reduce emissions, attract international financing, and adapt to technological change, the costs associated with delaying the energy transition may become more significant. In this context, the tension between short-term economic gains and long-term sustainability objectives becomes increasingly evident. Moreover, processes such as carbon lock-in and policy feedback can reinforce existing energy pathways, making future transitions more costly and difficult to achieve.

In interpreting these conclusions, a distinction should be maintained between what this study documents and what it interprets. The characterization of the policy set, its instruments, and its institutional consequences rests on the document analysis described in [Section 3](#) and the descriptive indicators of [Section 5.3](#); the assessment of longer-term implications—lock-in, investment uncertainty, and international credibility—rests on theoretically specified mechanisms informed by the secondary literature, and the causal claims involved remain untested hypotheses rather than established effects.

From a policy perspective, the main lesson is that energy security and economic competitiveness should be pursued in a way that remains compatible with climate commitments and long-term energy transition goals. Achieving this balance requires stable and predictable regulatory frameworks, transparent permitting and approval processes, and policies that support a just transition for affected communities and sectors. Such measures can help reduce the tensions between short-term economic objectives and the broader goal of sustainable development while creating a more resilient foundation for future energy policy. For import-dependent economies such as Türkiye, the comparative analysis in [Section 5.7](#) adds a sharper edge to this lesson: where trade-linked climate instruments such as the EU's Carbon Border Adjustment Mechanism are in force, delaying the transition incurs immediate competitiveness costs rather than merely deferred environmental ones.

The main limitation of this study follows from its design: it is a theory-driven mechanistic analysis rather than a causal-inference empirical study. It does not employ econometric techniques or statistical causality tests; its conclusions rest on a document-based analysis of policy developments, descriptive statistics, and a synthesis of the relevant literature. Within these limits, the mechanism-based approach offers a structured account of how policies were designed, implemented, and constrained by institutional structures, and the explicitly specified causal chains of [Section 5.2](#) are formulated so as to serve as a hypothesis-generating foundation for subsequent quantitative research.

Future research could build on this analysis by comparing the Trump administration's energy policies with those of preceding and subsequent administrations in order to better identify patterns of continuity and change in U.S. energy governance—a comparison for which the second-term developments discussed in [Section 5.8](#) already provide initial material. The delay interpretation advanced here is, in this sense, directly testable: interrupted time-series estimates around the 2017 and 2021 policy breaks, or difference-in-differences comparisons across states with differing exposure to federal regulation, could quantify what this study establishes descriptively. Such comparative studies would provide a deeper understanding of how political leadership influences the relationship between energy policy, development objectives, and climate commitments. In addition, future work could explore the effects of multi-level governance in greater detail through state-level case studies or sector-specific analyses focusing on industries such as coal, oil, natural gas, and renewable energy. These approaches would help clarify how different actors and sectors respond to policy shifts and how energy transitions unfold across diverse institutional and economic contexts.

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Abbreviations

The following abbreviations are used in this manuscript:

ACE	Affordable Clean Energy (rule)
ANWR	Arctic National Wildlife Refuge
BLM	Bureau of Land Management
BLS	U.S. Bureau of Labor Statistics
BNEF	BloombergNEF
Btu	British thermal unit
CARB	California Air Resources Board
CBAM	Carbon Border Adjustment Mechanism

COVID-19	Coronavirus disease 2019
EELP	Environmental and Energy Law Program (Harvard Law School)
EIA	U.S. Energy Information Administration
EU	European Union
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GDP	Gross domestic product
LNG	Liquefied natural gas
NDC	Nationally Determined Contribution
NGO	Non-governmental organization
NEPA	National Environmental Policy Act
SAFE	Safer Affordable Fuel-Efficient (Vehicles Rule)
SDG	Sustainable Development Goal
UNFCCC	United Nations Framework Convention on Climate Change
WOTUS	Waters of the United States
WRI	World Resources Institute
WTI	West Texas Intermediate

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