

NEPA LITIGATION OVER LARGE ENERGY AND TRANSPORT INFRASTRUCTURE PROJECTS

by Michael Bennon and Devon Wilson

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SUMMARY

Despite five decades of experience, there is a considerable gap in legal and empirical study on the impacts of the National Environmental Policy Act (NEPA). Proponents of reform often claim NEPA litigation is a major obstacle for federal actions; others have concluded litigation is not a major contributor of project cost escalation or delays. This Article studies the incidence and conditions of infrastructure project litigation under NEPA, using a data set of 355 major transportation and energy infrastructure projects that completed a federal environmental study between 2010 and 2018. We observe predevelopment litigation on 28% of the projects requiring an environmental impact statement, 89% of which involve a claim of a NEPA violation. The highest litigation rate is in solar energy projects, nearly two-thirds of which are litigated. Other high-litigation sectors include pipelines (50%), transmission lines (31%), and wind energy projects (38%). Energy sectors with greater private financing have shorter permit durations and higher rates of litigation and cancellation, but also higher completion rates relative to transport sectors, which have greater public financing and lower litigation rates but longer permit timelines.

Both critics and supporters of the National Environmental Policy Act of 1970 (NEPA)¹ would agree that it has been one of the most impactful laws in modern American history. They would also likely agree that NEPA is very poorly understood today. They would agree on very little else. Supporters of NEPA refer to it as the “Magna Carta” of environmental law,² and further as having attained “quasi-constitutional status as one of the foundational laws of the modern administrative state.”³ Critics, alternatively, refer to the law as “the most expensive and least effective environmental law in the history of the United States,”⁴ which produces environmental impact statements (EISs) “so voluminous that no one considers or even reads them, much less attempts to modify decisions on the basis of their findings.”⁵

Few procedural laws attract such a wide range of perspectives, yet NEPA is first and foremost a procedural framework for federal agencies. It simply requires those agencies to study the environmental and social impacts of their actions before they undertake them.⁶ The most important and significant of these studies is the production of an EIS for “major federal actions significantly affecting the quality of the human environment.”⁷ The EIS process applies to large infrastructure projects that require federal approval, as well as any other environmentally impactful action that a federal agency plans to undertake.

The NEPA process is not purely administrative, however. It also includes a democratic process by which draft versions of environmental studies are made available to the public for a comment period and a public consultation. Federal agencies must then respond to those public comments and publish a final version of the EIS that accounts for that public input.

Lastly and most importantly, NEPA is also governed by a judicial process. Citizens and stakeholder groups who believe the federal agency’s environmental study did not

1. 42 U.S.C. §§4321-4370h, ELR STAT. NEPA §§2-209.

2. DANIEL R. MANDELKER ET AL., NEPA LAW AND LITIGATION §1.1 (2022).

3. Bradley Karkkainen, *Whither NEPA?*, 12 N.Y.U. ENV’T L.J. 333 (2004).

4. MARK RUTZICK, REGULATORY TRANSPARENCY PROJECT, A LONG AND WINDING ROAD: HOW THE NATIONAL ENVIRONMENTAL POLICY ACT HAS BECOME THE MOST EXPENSIVE AND LEAST EFFECTIVE ENVIRONMENTAL LAW IN THE HISTORY OF THE UNITED STATES, AND HOW TO FIX IT (2018).

5. MATTHEW LINDSTROM & ZACHARY SMITH, THE NATIONAL ENVIRONMENTAL POLICY ACT: JUDICIAL MISCONSTRUCTION, LEGISLATIVE INDIFFERENCE & EXECUTIVE NEGLECT 127 (2001).

6. MANDELKER ET AL., *supra* note 2, §1.2.

7. 42 U.S.C. §4332(2)(C)(i) (1969).

meet the procedural requirements of NEPA may challenge the permit in federal court, and courts may enjoin agencies from taking the studied action until all identified defects are remedied.⁸

This combination of administrative, democratic, and judicial processes is one of the reasons NEPA is widely considered a foundational law of the modern administrative state. It has fundamentally changed the way federal agencies approach decisions, and further has served as a model for a wide range of state-level environmental laws, international environmental laws, and even environmental safeguard programs at multilateral development institutions.⁹ Today, NEPA also acts as an “umbrella” statute that overlaps or interacts with a number of substantive permitting processes, including the Endangered Species Act (ESA),¹⁰ Clean Air Act (CAA),¹¹ and Clean Water Act (CWA),¹² as well as state or local environmental regulations. Sen. Henry Jackson (D-Wash.), one of NEPA’s architects, called it “the most important and far-reaching environmental and conservation measure ever enacted by the Congress.”¹³

During the brief floor debate before NEPA passed the U.S. House of Representatives in 1969, Rep. William Harsha (R-Ohio) of the Public Works Committee, in a very different way, acknowledged NEPA’s importance:

I must warn the Members that they should be on guard against the ramifications of a measure that is so loose and ambiguous as this. . . . [T]his is a major revision of the administrative functions of the U.S. Government The impact of [NEPA], if it becomes law, I am convinced would be so wide sweeping as to involve every branch of the Government, every committee of Congress, every agency, and every program of the Nation.¹⁴

Senator Jackson and Representative Harsha thus agreed in foresight in the same way that NEPA’s supporters and critics agree in hindsight.

Today, proposals for permitting reform and NEPA “streamlining” are being proposed and debated in the U.S. Congress, and some statutory reforms were passed into law in the Fiscal Responsibility Act of 2023.¹⁵ Recent

NEPA guidance changes by the Council on Environmental Quality (CEQ) have also produced whiplash-inducing back-and-forth rulemakings between the Donald Trump and Joseph Biden Administrations.¹⁶ Yet, despite NEPA’s importance and the amount of debate over NEPA reforms, there is a startling lack of information and almost no consensus on even the most measurable aspects of the law’s application and impact on infrastructure development in the United States.¹⁷

Does the NEPA process increase the costs of large U.S. infrastructure projects? If so, by how much?¹⁸ How much does the NEPA process contribute to delays and related cost inflation of large projects? Does NEPA make it too easy for small groups of stakeholders or environmental groups to block, delay, or drive up the costs of projects that they oppose? Environmental litigation, in particular, has been singled out by some of NEPA’s critics as a source of uncertainty and delay associated with the NEPA process.¹⁹ Yet other studies of NEPA have concluded that NEPA litigation has not been used excessively, and that there is little evidence that the NEPA process is too burdensome.²⁰

alone permitting reform legislation have failed to pass, though negotiations are ongoing. In fall 2022, Sen. Joe Manchin (D-W. Va.) and Sen. Shelley Moore Capito (R-W. Va.) produced separate pieces of draft permitting reform legislation, though neither passed into law. Rachel Frazin, *Senate Rejects Manchin’s Energy Permitting Amendment to Defense Bill*, HILL (Dec. 15, 2022), <https://thehill.com/policy/energy-environment/3776418-senate-rejects-manchins-energy-permitting-amendment-to-defense-bill/>.

16. In July 2020, CEQ under the Trump Administration published new guidance for federal agencies on implementing NEPA via an administrative rulemaking. Among other changes, the new guidance would have required agencies to study environmental impacts with “a reasonably close causal relationship” to the proposed federal action, rather than cumulative or indirect environmental impacts. The new guidance would have also clarified that the CEQ guidance was a “ceiling” for the procedures that agencies should study under NEPA rather than a “floor” that agencies could go beyond. Key changes in that CEQ guidance never took effect. Agencies were scheduled to implement the guidance by September 2021. However, in June 2021, CEQ under the Biden Administration published an administrative rulemaking delaying the implementation date for agencies to September 2023. In April 2022, CEQ published an additional rulemaking reversing three of the key changes made in the 2020 CEQ rulemaking. For a criticism of the 2020 CEQ guidance rulemaking, see Robert L. Glicksman & Alejandro E. Camacho, *The Trump Card: Tarnishing Planning, Democracy, and the Environment*, 50 ELR 10281 (Apr. 2020).
17. See *infra* Section I.E for a review of recent and historical attempts to empirically study the NEPA process, and NEPA litigation, or to gather data on the costs, duration, or frequency of federal permitting.
18. See *infra* Section I.C for a discussion of cost inflation in the U.S. infrastructure development sector in the post-NEPA era more generally, and a review of existing literature on that topic. See *infra* Section I.D for a discussion of the challenges of measuring or causally attributing the direct and indirect costs and benefits of NEPA on specific infrastructure projects, infrastructure development generally, and on the broader U.S. economy and environment.
19. See RUTZICK, *supra* note 4, for a wide range of criticisms of NEPA. On the “Role of Litigation in NEPA’s Implementation,” see a review of critiques in LINDA LUTHER, CONGRESSIONAL RESEARCH SERVICE, *THE NATIONAL ENVIRONMENTAL POLICY ACT: STREAMLINING NEPA* (2007). For a discussion of the House Committee on Resources’ 2006 NEPA task force claim that the threat of litigation impacts permit durations, see Piet deWitt & Carole A. deWitt, *How Long Does It Take to Prepare an Environmental Impact Statement?*, 10 ENV’T PRAC. 164 (2008). On the impacts of the “threat of litigation” on permitting decisions in the U.S. Forest Service, see Michael J. Mortimer et al., *Environmental and Social Risks: Defensive National Environmental Policy Act in the US Forest Service*, 109 J. FORESTRY 27 (2011). See MANDELKER ET AL., *supra* note 2, §11.2 for a general review of NEPA detractors and critiques.
20. See *infra* Section I.E for a summary of recent empirical studies of the NEPA permitting and litigation cost burden. Three recent studies that did not find

8. MANDELKER ET AL., *supra* note 2, §1.1.

9. *Id.* §12 includes a discussion of U.S. state-level environmental legislation that was modeled after NEPA, and §13 includes a review of similar laws in Europe, the United Kingdom, and Canada with a permitting process partially modeled after NEPA. For a discussion of the history of the congressional actions that influenced the creation of a NEPA-like process for the safeguard programs at the World Bank in the 1990s, see Kristina Daugirdas, *Congress Underestimated: The Case of the World Bank*, 107 AM. J. INT’L L. 517 (2013).

10. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

11. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

12. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

13. 115 CONG. REC. 40416 (1969).

14. *Id.* at 40927-28.

15. See *infra* notes 150 and 151 and accompanying text for a discussion of the administrative and judicial reforms in the Fiscal Responsibility Act of 2023, respectively. The 2021 Infrastructure Investment and Jobs Act also included some reforms to the permitting process under NEPA, including codifying into law the One Federal Decision policy, which was intended to improve agency coordination across the multiple federal permitting actions required for a large infrastructure project. Other recent attempts at stand-

Part of the reason that the data-based analysis debate over NEPA's economic impacts is so inconclusive is that the effects of a procedural law as broad-ranging as NEPA are predominantly second- and third-order effects that are naturally difficult to measure and even more difficult to attribute to a specific law. NEPA's environmental impacts are similarly difficult to quantify and attribute. However, it intuitively follows that requiring an agency to study the environmental impacts of a project will induce the agency to make less environmentally impactful decisions on the margins. In a similar manner, we know that the costs of a lawsuit or an environmental study are not limited to the fees of the lawyers and environmental consultants needed to adjudicate them.

Even granted this natural limitation, there remains a considerable gap in the existing literature on the impacts of the NEPA process and environmental litigation on infrastructure development in the United States. To address this gap, we examined an existing data set of 355 large federal infrastructure projects in the transportation and energy sectors that completed an EIS between 2010 and 2018. We supplemented the data set with information on environmental litigation associated with those projects, as well as other important project information, such as current project status, subsector, permit duration, and in some cases permit length (in pages). Our data set was originally published by CEQ,²¹ and consists of projects that published a final EIS between 2010 and 2018 in the transportation (184 projects) and energy (171 projects) sectors.

Our analysis is focused on the correlation between environmental litigation and other project characteristics, such as the duration of the permitting process, the sector of the project, and other factors. We also examine the relationship between environmental litigation and project outcomes, such as cancellation, by sector. We further aimed to focus our study on large infrastructure projects in particular. As discussed herein, many prior studies of NEPA practices and environmental litigation have focused on land management agencies such as the U.S. Forest Service or the Bureau of Land Management (BLM). We aimed to focus specifically on infrastructure projects because they differ from area management or forestry projects in terms of both the impacts of the federal actions on the environment, and the practical impacts of environmental litigation on the projects.

This Article proceeds as follows. Part I covers NEPA background and the research need for the present study, including an overview of the NEPA administrative process, the role of judicial review of NEPA permits, and trends in U.S. infrastructure development in the post-NEPA era. This part also includes a discussion of the difficulty in estimating or attributing the costs and other impacts associated with the NEPA process, reviews prior empirical studies of NEPA litigation, and proceeds to define our research need. Part II then describes the data set and methodology used for this study in additional detail.

Part III includes the results of this analysis and some discussion of the implications of our findings. Among our other findings, we discuss the rate of litigation on projects in our data set (28%) and the correlation between project characteristics and other factors, including the sector of the project and future project outcomes, such as cancellation. We discuss differing rates of litigation and permit durations between major energy and transportation sectors. We also discuss project outcomes after completing a final EIS, as less than half of the projects in our data set were built and in operation at the time this study was completed.

Finally, Part IV presents our conclusions and recommendations, and discusses additional areas for future research.

I. NEPA Background and Research Need

NEPA was passed by Congress with remarkably little debate, and was signed into law by President Richard Nixon on January 1, 1970. It was noted in the years since that many of the legislators voting on NEPA did not know what they were passing.²² In fact, judicial review of environmental studies was never mentioned in the legislative debates over the law. The only congressional debate over potential judicial activity that could follow from NEPA was over a potential “environmental rights” provision that was never included in the final version of the law.²³ The requirement to produce an impact “statement” itself was a late addition to the law, which originally included a requirement that agencies make environmental “findings.” There was little debate, or detail in the law itself, regarding what a “statement” would consist of.²⁴

NEPA was drafted during a period of heightened environmental awareness and activism. It was one of many laws

considerable evidence of a NEPA litigation burden include David E. Adelman & Robert L. Glicksman, *Presidential and Judicial Politics in Environmental Litigation*, 50 ARIZ. STATE L. REV. (2018) (“We find little evidence that litigation under NEPA is out of control or that NEPA processes are overly burdensome.”); John C. Ruple & Kayla Race, *Measuring the NEPA Litigation Burden: A Review of 1,499 Federal Court Cases*, 50 ENV'T L. 479 (2020) (“Overall, we conclude that the NEPA litigation burden may be overstated”); and John C. Ruple et al., *Evidence-Based Recommendations for Improving National Environmental Policy Act Implementation*, 46 COLUM. J. ENV'T L. 273 (2022) (“Even though litigation is rare, it often has merit.”).

21. CEQ, ENVIRONMENTAL IMPACT STATEMENT TIMELINES (2010-2017) (2018). CEQ gathered summary data on EIS permitting timelines for more than 1,400 federal actions and produced some summary statistics by department.

22. RICHARD A. LIROFF, A NATIONAL POLICY FOR THE ENVIRONMENT: NEPA AND ITS AFTERMATH 5 (1976). NEPA was rather a “statement of national environmental policy,” as the policy itself would stem from the case law, federal rulemakings, and administrative actions that would follow in the decades after NEPA's passing. (“For many legislators, undoubtedly, a vote for NEPA was symbolic—akin to a vote for motherhood and apple pie. Little did they realize, however, that in voting to enact NEPA, they were placing a potent weapon in the hands of citizen activists.”)

23. *Id.* at 31.

24. *Id.* at 32. In the years following NEPA's passing, federal agencies also took a wide range of approaches in determining when EISs were necessary and the types of analysis they should include, though the scope of EIS development was clearly much lower than it is today. Between June and August 1971, for instance, state highway departments drafted 423 EISs for projects, the majority of which were fewer than 15 pages long. Only six of the statements were longer than 85 pages.

regulating the environment to emerge from the late 1960s.²⁵ One of the key originators of the ideas that contributed to NEPA was Prof. Lynton K. Caldwell of Indiana University, who proposed a new area of “environmental administration” public policy.²⁶ He would later feature prominently in the congressional hearings leading to NEPA’s passage. In his original proposal, Professor Caldwell noted the balance needed in crafting such an environmental policy:

As with most concepts, environmental administration in any of its meanings can be pushed to the point of absurdity. Dealing with environments comprehensively need not imply endlessly detailed analyses and hopelessly complex synthesis of all environmental factors before policies can be formulated. There is a common-sense balance between the too-often uninformed, expedient, piecemeal methods now generally pursued and a perfectionist effort to take into account absolutely everything relevant to a contemplated environmental change.²⁷

It is possible that NEPA’s architects, even Senator Jackson, failed to foresee²⁸ the volume of litigation that would stem from the law because the environmental law sector was nascent, almost nonexistent, at the time of NEPA’s passing. It would not remain nascent very long after NEPA became law, leading one congressional staffer to note afterwards that if “Congress had appreciated what the law would do, it would not have passed. They would have seen it as screwing public works”²⁹

A. The NEPA Administrative Process

The administrative process agencies use to complete permits under NEPA has evolved considerably since its passing, in part because the actual delegating and procedural language of the statute itself is “framed in lofty generalities.”³⁰ NEPA has evolved primarily in response to case law from the judiciary,³¹ but the law also created CEQ in the Executive Office of the President, which President Nixon later tasked with issuing guidelines to federal agencies on the preparation of EISs and other NEPA procedures.

NEPA evolved rapidly in response to case law in the 1970s, and by the second half of the decade, observers were beginning to express concerns that NEPA was causing a delay in federal decisionmaking and EISs were getting too long. To streamline the process, President Jimmy Carter’s CEQ published a broader, binding set of NEPA regulations in an attempt to standardize NEPA practices across agencies.³² Some of the elements of that same CEQ rulemaking remain in effect today.

In fact, it is remarkable that NEPA’s evolution has been so primarily driven by case law rather than executive orders or major guidance by CEQ. After the 1978 CEQ guidance changes, NEPA did not undergo another major guidance change until CEQ published another revision in 2020, which was followed by additional rulemakings in 2021 and 2022.³³ What follows, then, is a brief description of NEPA’s administrative processes as they stand at the drafting of this Article.³⁴

The basic objective of the NEPA process is for agencies to be able to identify alternatives to a proposed federal action, and then evaluate the impacts of those alternatives so the agency can select the least environmentally impactful alternative that meets its objectives. This is the analysis undertaken and documented in an EIS, which is used for a project that the agency believes will have significant environmental or social impacts.³⁵

First, however, the lead agency for a NEPA action must determine whether an EIS is required. For actions excluded from the NEPA process by statute or that are of a type previously deemed not to have significant impacts, agencies instead complete a categorical exclusion (CE), a relatively minor bureaucratic exercise that also accounts for the vast majority of the total federal “actions” completed under NEPA each year.³⁶ A third, middle tier of NEPA review is the environmental assessment (EA), which is used by agencies when it is unclear whether the action will have significant impacts or not. The EA is intended to be a “concise public document,” and is less of an undertaking compared

25. NEPA was the first of a wave of federal environmental laws that were passed in the early 1970s, including the CAA in 1970, the CWA in 1972, and the ESA in 1973 (see MANDELKER ET AL., *supra* note 2). Several pieces of predecessor legislation to NEPA were introduced as early as 1959, but failed to pass into law. For a discussion of the studies and events leading to NEPA’s passage, see Dinah Bear, *The National Environmental Policy Act: Its Origins and Evolutions*, 10 NAT. RES. & ENV’T 69 (1995).

26. Lynton K. Caldwell, *Environment: A New Focus for Public Policy?*, 23 PUB. ADMIN. REV. 132 (1963). For a discussion of Caldwell’s writing and testimony in the 1960s and its impact on NEPA’s development, see also LINDSTROM & SMITH, *supra* note 5.

27. Caldwell, *supra* note 26.

28. LIROFF, *supra* note 22, at 31 (noting that according to congressional staff interviews, Senator Jackson recognized that litigation could stem from NEPA, but did not foresee the volume of litigation that would occur in the years after NEPA’s passing).

29. *Id.* at 35.

30. Karkkainen, *supra* note 3.

31. See *infra* Section I.B for a review of some of the early judicial history of NEPA’s case law development.

32. Dinah Bear, *NEPA at 19: A Primer on an “Old” Law With Solutions to New Problems*, 19 ELR 10060 (Feb. 1989).

33. See note 16 for a discussion of recent CEQ NEPA guidance rulemakings.

34. As this Article was being completed, multiple proposals for permitting reform legislation were being introduced in Congress. In August 2022, Sens. Joe Manchin (D-W. Va.) and Chuck Schumer (D-N.Y.) announced an agreement to pass comprehensive permitting reform before the end of the fiscal year. In September 2022, Senator Manchin released draft legislation and Sen. Shelley Moore Capito (R-W. Va.) released draft permitting reform legislation supported by some Republicans. The legislation failed to pass into law. More recently, the Fiscal Responsibility Act of 2023 included several statutory changes to NEPA, though these did not impact the basic structure of NEPA’s administrative process described in this section. See *infra* notes 150 and 151 and accompanying text for a discussion of the administrative and judicial reforms in the Fiscal Responsibility Act of 2023, respectively.

35. 40 C.F.R. §1502.14.

36. The number of federal permits by level of NEPA analysis required is not centrally reported or routinely tracked by some agencies. However, CEQ estimates that approximately 95% of NEPA studies are CEs, less than 5% are environmental assessments (EAs), and less than 1% are EISs. These estimates align with other studies on the type and frequency of NEPA studies. For a detailed review of permitting type and cost information available from federal agencies, see U.S. GOVERNMENT ACCOUNTABILITY OFFICE (GAO), *LITTLE INFORMATION EXISTS ON NEPA ANALYSES* (2014).

to an EIS.³⁷ Once the EA is completed, the agency proceeds to complete an EIS if one is warranted, or publishes a finding of no significant impact (FONSI) if it determines that the action will not have significant environmental impacts.

Public comment is a core part of the EIS development process. Federal agencies begin the process by publishing a notice of intent that solicits general public comment on the planned action and alternatives.³⁸ The agency then completes and publishes a draft EIS for a mandatory public comment period.³⁹ The agency then publishes a final EIS that accounts for and responds to the comments received. A supplemental EIS may be published if the agency identifies any deficiencies in the original study or needs to incorporate new information.⁴⁰ The NEPA process ends when the agency publishes a record of decision (ROD),⁴¹ which notifies the public that the agency is moving forward with the preferred alternative identified for the project.

B. Judicial Review Under NEPA

Judicial review is the most important driver of the NEPA process for a number of reasons. Judicial review of the definitions of NEPA's critical terms is still surprisingly common despite 50+ years of case law. That case law further drives the administrative and public consultation processes of NEPA, as agencies adapt to courts' evolving interpretations of NEPA's requirements. Even the threat of litigation under NEPA has been reported to significantly impact the permitting process for a federal action prior to any litigation actually being filed. This is a process that has been referred to as "litigation proofing" an environmental study.⁴²

NEPA has produced an enormous amount of federal case law since its passage and continues to do so to this day. It has generated so much judicial activity in part because the study of the environment is naturally somewhat open-ended. There are an unlimited number of "alternatives" that could theoretically be studied for any infrastructure project, and the environmental "impacts" studied range from the direct impacts of a project to second- and third-order impacts propagating through space and time, with a butterfly effect of global and generational impacts. The point is that, unlike other types of state planning endeavors, environmental studies require a clear limiting scope, determined by law or agency discretion, lest planners plan into eternity.

In the case of NEPA, that limiting principle on the scope of environmental study is not found in law. NEPA's "opaque, constitution-like language seems to give courts

enough latitude to subject NEPA documents to either the hardest of looks or the softest of glances."⁴³ Judicial flexibility translates to agency uncertainty, to the point that permitting time and effort may be driven less by the anticipation of environmental impacts and more by the presence of conflict, or stakeholders with the resources and motivation to litigate against the project.⁴⁴

The procedural nature of NEPA litigation is a key driver of "litigation proofing" and why contentious environmental studies under NEPA tend to grow into the many thousands of pages, despite the fact that strict page limits for EISs have been recommended by CEQ guidance since 1978.⁴⁵ When asked to review NEPA studies, courts are deferential to federal agencies on their substantive determinations.⁴⁶ They are far less deferential when considering topics, impacts, or alternatives that were not included in the environmental study. This dynamic can create a game of "cat and mouse" for project opponents and federal agencies, in which potential litigants try to identify and comment on alternatives or impacts that were not studied, and federal agencies are left to study everything as a means of litigation-proofing their environmental study.⁴⁷

When courts determine that an environmental study under NEPA is insufficient, they may intervene by enjoining the permit decision and remanding the project for additional study. The use of injunctions to stop projects from moving forward is due in part to the emphasis courts have placed on NEPA's procedural requirements, and in part because the court's review of the relevant environmen-

37. Bear, *supra* note 32.

38. 40 C.F.R. §1501.9(d) (2020).

39. *Id.* §1502.9(b).

40. *Id.* §1502.9(d)(1). As a practical matter, a supplemental EIS may also be a good sign of conflict over a project. Based on the public comments received on the original EIS, an agency may become aware of the potential for litigation and aims to head off that litigation by completing additional environmental study of the issues raised in comments.

41. *Id.* §1502.

42. SUSAN M. SMILLIE & LUCINDA L. SWARTZ, *ACHIEVING THE 150-PAGE ENVIRONMENTAL IMPACT STATEMENT* (1997).

43. Michael C. Blumm & Stephen R. Brown, *Pluralism and the Environment: The Role of Comment Agencies in NEPA Litigation*, 14 HARV. ENV'T L. REV. 277 (1990).

44. deWitt & deWitt, *supra* note 19, and Mortimer et al., *supra* note 19, discuss the threat of litigation as a factor in determining agency permitting decisions under NEPA. SMILLIE & SWARTZ, *supra* note 42, discuss the concept of agency attempts to "litigation proof" an environmental study as a key factor in the growing length of studies. Ruple et al., *supra* note 20, at 330, examined Forest Service regional round tables and found "concern over litigation aversion featured prominently in every region." That study also found that "there is important variability in decision-making times across levels of analysis" in NEPA studies. *Id.* at 302.

45. 40 C.F.R. §1502.7 (1978) includes page limits for a final EIS of 150 pages, or 300 pages for "proposals of unusual scope and complexity."

46. Lynton K. Caldwell, *Beyond NEPA: Future Significance of the National Environmental Policy Act*, 22 HARV. ENV'T L. REV. 203 (1998) ("But what of the substantive provisions of the Act of which the courts take cognizance only in cases of flagrant dereliction and which the executive branch may, without penalty, conveniently ignore?"). See also Dean K. Emery, *The National Environmental Policy Act of 1969, an Attempt to Tailor the Government Processes to Environmental Needs*, 26 OKLA. L. REV. 141 (1973), for a detailed review of the courts' disparate treatment between NEPA's substantive §101 and its procedural §102 in early legal decisions regarding the statute.

47. SMILLIE & SWARTZ, *supra* note 42 (noting the tendency of agency lawyers to demand additional information in NEPA studies to litigation-proof the document). See also LIROFF, *supra* note 22, at 135, citing an unpublished dissertation, studying U.S. Army Corps of Engineers projects, that more than twice the effort was spent on the preparation of environmental statements for controversial projects than was devoted to statements for noncontroversial ones, and a significantly greater than average effort was put into the preparation of environmental statements by those Corps districts that had been subjected to NEPA based lawsuits.

tal permit or permits would be rendered moot by the ongoing development of the project.⁴⁸

The courts' present interpretation of NEPA started on its course in a series of appellate decisions in 1971. The first and most important was the *Calvert Cliffs' Coordinating Committee* case,⁴⁹ brought by environmental groups against the Atomic Energy Commission (AEC). In revoking AEC's NEPA regulations, the U.S. Court of Appeals for the Sixth Circuit established the precedent for detailed judicial review of NEPA's *procedural* requirements while maintaining that agencies could retain the "responsible exercise of discretion" regarding the *substantive* policies in §101 of NEPA.

The court justified intervention on procedural grounds by stating that it was necessary to ensure that congressional intent was "not lost in the hallways of the bureaucracy."⁵⁰ The case established the precedent for detailed judicial review of agency NEPA decisions and the standard that agencies comply "to the fullest extent possible," as "Congress did not intend the Act to be a paper tiger."⁵¹ NEPA would be a paper tiger no longer.

On the question of limitations for its judicial reviews of agency NEPA decisions, the court in the *Calvert Cliffs'* decision stated: "Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgement for that of the agency."⁵²

The *Calvert Cliffs'* decision combined with the *Environmental Defense Fund v. Corps of Engineers*⁵³ decision earlier in 1971 to establish the basis for judicial review of NEPA studies. In the *Environmental Defense Fund (EDF)* case, the district court enjoined the construction of the Gillham Dam on the basis that alternatives to the planned project were not sufficiently assessed. The decision also established that an EIS should include public comments or a "critical analysis" from project opponents, which disagree with

the agency calculations, in the EIS itself in order to be procedurally complete.⁵⁴ The case was also one of several from that period that established a precedent of enjoining projects that were already under construction despite the potential costs of doing so, unless it was clear that the costs of such an injunction would outweigh the potential environmental benefits.⁵⁵

The U.S. Court of Appeals for the Eighth Circuit in the Gillham Dam case further elaborated on whether, and why, courts should conduct detailed reviews of EISs going forward:

Here, important legal rights are affected. NEPA is silent as to judicial review, and no special reasons appear for not reviewing the decision of the agency. To the contrary, the prospect of substantive review should improve the quality of agency decisions and should make it more likely that the broad purposes of NEPA will be realized.⁵⁶

With the precedent established for judicial review of agencies' procedural compliance, environmental litigation challenging agencies' NEPA studies increased rapidly through the early 1970s and continued at a similar rate for another decade.⁵⁷ That litigation generated a concomitant wave of case law that ruled on almost every substantive term contained in NEPA's statute and regarding its administration. Federal courts have weighed in on what it means to be a "significant" environmental impact,⁵⁸ what agencies must do to comply with NEPA "to the fullest extent possible,"⁵⁹ and the criteria for a decision to be a "major

48. Federal courts have long held that an injunction is the necessary remedy when it concludes there was a "substantial" procedural violation of NEPA that could result in "irreparable harm," but in practice, courts have taken a very broad interpretation of those terms. See *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1250, 15 ELR 20035 (9th Cir. 1984) ("Only in a rare circumstance may a court refuse to issue an injunction when it finds a NEPA violation.").

49. *Calvert Cliffs' Coordinating Comm. v. U.S. Atomic Energy Comm'n*, 449 F.2d 1109, 1 ELR 20346 (D.C. Cir. 1971).

50. *Id.*

51. *Id.* Several studies in the immediate aftermath of the *Calvert Cliffs'* decision remarked on its potential implications and agency interpretations of NEPA's requirements before the ruling. See A. Dan Tarlock, *Balancing Environmental Considerations and Energy Demands: A Comment on Calvert Cliffs' Coordinating Committee, Inc. v. AEC*, 47 IND. L.J. 645, 647 (1972) (noting the shift of the *Calvert Cliffs'* court in that prior to the decision "courts have not been asked to decide if we should adopt a neo-Malthusian policy and limit resource use to avoid future scarcities and consequent declines in this country's or the world's level of material progress"). See also James Bieber, *Calvert Cliffs' Coordinating Committee v. AEC: The AEC Learns the True Meaning of the National Environmental Policy Act of 1969*, 3 ENV'T L. 316, 316 (1973) (quoting former AEC Commissioner J.T. Ramey that "the entire thrust of the NEPA is to encourage a proper balance . . . The Act provides that all agencies of the Federal Government should study, develop, and describe appropriate alternatives . . .").

52. *Calvert Cliffs' Coordinating Comm. v. U.S. Atomic Energy Comm'n*, 449 F.2d at 1115.

53. 325 F. Supp. 728, 1 ELR 20130 (E.D. Ark. 1971).

54. *Id.*

55. See also the case on the Cross-Florida Barge Canal project, *Environmental Defense Fund v. Corps of Engineers*, 324 F. Supp. 878, 1 ELR 20079 (D.D.C. 1971), for a similar early case of an injunction of an already-in-development project. It is unclear how a court would be expected to undertake such a cost-benefit analysis of an injunction given the difficulty of appraising the costs (see *infra* Section I.D) of such an injunction for an ongoing project, let alone in estimating the environmental costs and benefits of such an action.

56. *Environmental Def. Fund v. Corps of Eng'rs*, 470 F.2d 289, 2 ELR 20740 (8th Cir. 1972).

57. LROFF, *supra* note 22, summarized NEPA litigation data from CEQ immediately after it became law. Through March 1, 1973 (NEPA's first 38 months), there were 363 NEPA-based lawsuits filed against federal agencies, and courts had issued 51 injunctions. See also Paul G. Kent & John A. Pendergrass, *Has NEPA Become a Dead Issue? Preliminary Results of a Comprehensive Study of NEPA Litigation*, 5 ENV'T L. & TECH. J. 11 (1986) (studying published NEPA cases and concluding that the number of EISs produced by federal agencies began to decline in 1974, and "the data indicates that both NEPA litigation and EIS filings have declined. However, it is equally significant that the percentage of NEPA litigation compared with the total number of EIS's filed has remained relatively constant since 1976 notwithstanding revisions to the CEQ guidelines and changes in administrations.").

58. See *Sierra Club v. Van Antwerp*, 661 F.3d 1147, 41 ELR 20346 (D.C. Cir. 2011), *as amended* (Jan. 30, 2012):

When reviewing an agency's finding of no significant impact (FONSI), the court must determine under the arbitrary, capricious, or abuse of discretion standard whether the agency (1) has accurately identified the relevant environmental concern, (2) has taken a hard look at the problem in preparing its FONSI, (3) is able to make a convincing case for its FONSI, and (4) has shown that even if there is an impact of true significance, an environmental impact statement (EIS) is unnecessary because changes or safeguards in the project sufficiently reduce the impact to a minimum.

59. See *Lathan v. Brinegar*, 506 F.2d 677, 687-88, 689, 4 ELR 20802 (9th Cir. 1974) (citing *Congressional Record*):

federal action.”⁶⁰ Courts have also delineated specifically when a supplemental EIS is required,⁶¹ the conditions under which a citizen or group has standing to sue under NEPA,⁶² and when agencies must study the “cumulative” impacts of a project.⁶³ While levels of litigation have fluctuated slightly over time, NEPA’s basic terms continue to be often litigated, and thus interpreted and reinterpreted by the courts, to this day.⁶⁴

C. American Infrastructure in the NEPA Era

While the judiciary’s interpretation of NEPA evolved, so too did the environmental movement of the late 1960s and early 1970s transition into an entire industry of stakeholder groups, law firms, and environmental consultants. While many environmental stakeholders were disappointed that courts were not enforcing NEPA’s substantive mandates, the comment-and-litigation process being delineated by the courts presented an opportunity to further environmental objectives by blocking or delaying projects or, perhaps more importantly, as a useful tool to gain leverage over the agencies trying to permit projects.

While the quality of environmental science in EISs may have been lacking, “if one takes a more political perspec-

tive, NEPA seems to have created a new, complex political process which can be and has been used very effectively to improve the social and environmental sensitivity of government decisionmakers.”⁶⁵ In particular, “the ability of sophisticated commentators to force delays can lead agency decisionmakers to respond positively to commentators rather than face the delay of constructing a detailed response to the comments. Delay is a particularly potent threat, of course, during a time of rapid inflation.”⁶⁶

This evolution in federal agency decisionmaking and their interactions with environmental stakeholders coincided with the growth of local and national environmental organizations that participate in NEPA litigation,⁶⁷ the rapid development of an environmental law discipline,⁶⁸ and the more gradual evolution of federal agency staff and consultants to incorporate more environmental scientists and engineers to complete environmental studies.⁶⁹

The infrastructure development sector in the United States also underwent significant changes both in the immediate aftermath of NEPA and in the decades that would follow, as the judiciary’s interpretation of NEPA continued to evolve. Specifically, the types of public works projects pursued by local public sponsors changed; project sponsors adjusted their development approaches in many ways to avoid conflict; the number of megaprojects that made it through the development process decreased; the role of federal funding in public works changed; and costs within the sector increased dramatically. Alan Altshuler and David Luberoff refer to the current era, from approxi-

It is the intent of the conferees that the provision “to the fullest extent possible” shall not be used by any Federal agency as a means of avoiding compliance with the directives set out in section [4332]. Rather, the language in section [4332] is intended to assure that all agencies of the Federal Government shall comply with the directives set out in said section “to the fullest extent possible” under their statutory authorizations and that no agency shall utilize an excessively narrow construction of its existing statutory authorizations to avoid compliance.

With respect to ongoing projects, section 128(a) and the regulations which implement it must be interpreted and administered, “to the fullest extent possible,” in accordance with the policies of NEPA. In appropriate cases this may mean total reassessment of the project in light of its potential environmental impact, i.e., the consideration of its wholesale alteration or abandonment. *Cf.* Jicarilla Apache Tribe of Indians v. Morton, *supra*.

60. *Sac & Fox Nation of Mo. v. Norton*, 240 F.3d 1250, 31 ELR 20434 (10th Cir. 2001), *cert. denied*, 534 U.S. 1078 (2002) (“Because of the operational similarity between NEPA, and NHPA [the National Historic Preservation Act], courts generally treat ‘major federal actions’ under NEPA as closely analogous to ‘federal undertakings’ under the NHPA.”).
61. *Marsh v. Oregon Nat. Res. Council*, 490 U.S. 360, 19 ELR 20749 (1989) (an agency must apply a “rule of reason” and prepare a supplemental EIS if there remains “major federal action” to occur, and if the new information will affect the quality of the human environment in a significant manner or to a significant extent not already considered).
62. *See Sierra Club v. Morton*, 514 F.2d 856, 5 ELR 20463 (D.C. Cir. 1975), *cert. granted*, 423 U.S. 1047, *cert. dismissed*, 424 U.S. 901, *rev’d on other grounds*, 427 U.S. 390 (1976) (environmental group, some of whose members resided in vicinity of proposed coal mine, had standing to maintain action to require federal agencies to prepare comprehensive regional EIS before allowing development of the Northern Great Plains, even though impact statement had been approved for mine in question).
63. *See Natural Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 297, 19 ELR 20386 (D.C. Cir. 1988) (citing *Kleppe v. Sierra Club*, 427 U.S. 390, 410, 6 ELR 20532 (1976) (“[P]roposals for . . . related actions that will have cumulative or synergistic environmental impact upon a region concurrently pending before an agency must be considered together. Only through comprehensive consideration of pending proposals can the agency evaluate the different courses of action.”)).
64. *See, e.g., Adelman & Glicksman, supra* note 20 (“The most common challenges focused on the alternatives considered in an EA or EIS, the cumulative impacts of a federal action, mitigation measures contemplated by an agency, and the scope of the NEPA analysis.”).

65. H. Paul Friesema & Paul J. Culhane, *Social Impacts, Politics, and the Environmental Impact Statement Process*, 16 SYMPOSIUM ON ENV’T IMPACT STATEMENTS 339 (1976).
66. *Id.*
67. LINDSTROM & SMITH, *supra* note 5. Many of the environmental organizations that would feature prominently in early or ongoing NEPA litigation were founded in the years before the law passed, which was a period of heightened environmental consciousness and organization. The EDF was founded in 1967, and the Natural Resources Defense Council was founded in 1969. Older organizations that would feature prominently in future NEPA litigation, such as the Sierra Club, would also see membership and donations increase significantly in the years before NEPA became law.
68. For this history see, for example, Paul Sabin, *Environmental Law and the End of the New Deal Order*, 33 LAW & HIST. REV. 965 (2015). The environmental law practice grew “explosively and dramatically” in the wake of NEPA, but many of the other environmental litigation groups grew as part of a broader mobilization of public interest litigation groups in the late 1960s and early 1970s. Many of the groups, including the Sierra Club’s Legal Defense Fund and the Center for Law and Social Policy, formed before NEPA became law and were litigating against infrastructure projects under other statutes prior to the landmark NEPA cases of the early 1970s. As noted by Paul Sabin, *supra*, at 968: “Only in the late 1960s did new ideas about government’s limitations, fresh judicial openness to lawsuits against agencies, and youthful disillusionment with private law practice intersect with Ford Foundation philanthropy to create a coherent field of public interest environmental law.”
69. See, for example, SERGE TAYLOR, *MAKING BUREAUCRACIES THINK: THE ENVIRONMENTAL IMPACT STATEMENT STRATEGY OF ADMINISTRATIVE REFORM* (1984), for a comprehensive study of administrative changes in environmental planning in federal agencies after NEPA. Paul J. Culhane, *NEPA’s Impacts on Federal Agencies, Anticipated and Unanticipated*, 20 ENV’T L. 681 (1990), discusses federal agency staff evolution as one of several ways NEPA has impacted the agency decisionmaking.

mately the mid-1970s to the present, as the “Do No Harm” period of American infrastructure development.⁷⁰

Under the new paradigm of the era, stakeholders would be able to block or significantly delay projects with local externalities. This had wider ramifications than simply increasing the unit costs of infrastructure development. For example, expanding urban airport capacity became extremely uncertain, and planners adjusted by siting new airports much further from city centers where fewer residents would live near the project.⁷¹ The few new highway projects that were completed were often planned as tunnels or below grade and intermittently covered.⁷² New rail transit lines were increasingly sited according to existing rights-of-way to avoid potential conflicts over property acquisitions.

As the new paradigm set in, “mitigations” eventually became a principal feature of project development. Planners and politicians used mitigation to offset the environmental impacts of their projects or, more practically, to convince stakeholders to refrain from taking the project to court. “With lawsuits a high probability, mitigation emerged as a strategy to avoid total gridlock.”⁷³ In an effort to avoid environmental litigation, the planners of Boston’s “Big Dig” megaproject signed more than 1,500 separate mitigation agreements, which accounted for half of the total project costs.⁷⁴ Given the ease of intervention in megaproject permitting, “the norm of mitigation frequently became an important source of leverage for groups with other concerns than merely repairing or counterbalancing project damages.”⁷⁵

Robert Kagan documented a similar dynamic regarding mitigations in a detailed review of the Century Freeway project in Los Angeles. The project was sued by environmental and community groups shortly after NEPA became law, though it had been approved and received federal funding several years earlier. It received an injunction in 1972, although one-third of the right-of-way had already been cleared. In 1979, the state settled the litigation via an

elaborate consent decree, which significantly increased the cost of the project over the next 14 years.⁷⁶

The number of federal actions that completed permitting at the EIS level also significantly decreased during the “Do No Harm” era. In 1976, CEQ reported that federal agencies completed 1,776 EISs. In 1984, the number of EISs completed by federal agencies was just 577.⁷⁷ The CEQ data set from which the present Article is derived consists of just 1,161 federal actions that completed the EIS process (through the publication of a ROD) between 2010 and mid-2018, or between 120 and 167 completed EISs per year.⁷⁸ Just as the number of EISs completed significantly decreased, so has the average number of pages in each EIS significantly increased over time.⁷⁹

There are many contributing causes of such a trend, but clearly federal agencies, and the state, local, or private-sector proponents of projects with whom those agencies work, pursued fewer projects that would require federal permitting, that were not included in a CE, and that would have significant environmental impacts. Some agencies may have made greater use of CEs, and some sectors received increased CEs by statute.⁸⁰ For decades, agencies have also clearly tried to structure projects so that they do not meet the threshold of “significant” environmental impact required to produce an EIS, and historically whether a project meets that threshold has been the most common subject of NEPA litigation.⁸¹

70. ALAN ALTSHULER & DAVID LUBEROFF, *MEGA-PROJECTS: THE CHANGING POLITICS OF URBAN PUBLIC INVESTMENT* (2003). Altshuler and Luberoff define four eras of urban infrastructure development in the United States. The first consists of everything up until 1950, when most infrastructure was privately provided and, when not private, then locally funded. 1950 to the mid-1960s is referred to as the “Great Mega-Project Era,” which saw significant federal funding for infrastructure and rampant growth. This was followed by the “Era of Transition” from the mid-1960s to the mid-1970s, which saw popular protest against large infrastructure projects, the rapid growth of the environmental movement, and the passage of a series of environmental protection laws such as NEPA.

71. *Id.* at 229 (noting that all of the major airports built in the 1960s and 1970s along with Denver International Airport in the 1990s were built on massive parcels on the urban perimeter).

72. *Id.*

73. *Id.* at 231. Several states would enact “mini-NEPAs” that included explicit action-forcing provisions for mitigations beyond what stakeholders could negotiate via the NEPA process alone. For a review of mitigation programs across U.S. environmental laws, see Thomas J. Schoenbaum & Richard B. Stewart, *The Role of Mitigation and Conservation Measures in Achieving Compliance With Environmental Regulatory Statutes: Lessons From Section 316 of the Clean Water Act*, 8 N.Y.U. ENV’T L.J. 237 (2000).

74. ALTSHULER & LUBEROFF, *supra* note 70, at 232.

75. *Id.* at 220.

76. ROBERT KAGAN, *ADVERSARIAL LEGALISM: THE AMERICAN WAY OF LAW* (2003). The Century Freeway was litigated in the wake of both NEPA and California’s state environmental law, the California Environmental Quality Act. Kagan noted that the consent decree required the California Department of Transportation to build new housing units expected to cost \$300 million for a project with an original budget of just \$500 million. Cooperation did follow from the litigation settlement. As Kagan described:

A decade of often acrimonious judicial hearings ensued, revolving around the implementation, interpretation, and amendment of the consent decree. Despite the judicial mandate commanding cooperation among the parties, an adversarial spirit prevailed. Although hardly anyone, including the communities along the route, thought that the Century Freeway should *not* be built, the freeway was not completed until 1993 . . . One can scarcely imagine the intervening financial, environmental, and emotional harm engendered by thousands of pollution-spewing traffic jams.

Id. at 211. The cost of the Century Freeway would increase to approximately \$2.2 billion.

77. Kent & Pendergrass, *supra* note 57.

78. CEQ, *supra* note 21.

79. A recent study of EIS page lengths was CEQ, *LENGTH OF ENVIRONMENTAL IMPACT STATEMENTS (2013-2018)* (2020). The study included 656 EISs. For final EISs, the average document length was 661 pages not including appendices. Final EIS appendices averaged 1,042 pages in length. CEQ’s 1978 NEPA guidance specifies a page limit (40 C.F.R. §1502.7) of 150 pages, or 300 pages for proposals of “unusual scope and complexity,” unless a senior official approves a new page limit. EISs clearly started small, but page counts have gradually increased over time. See *supra* note 24, describing one accounting of 423 EISs produced by the Federal Highway Administration in NEPA’s early years, half of which were fewer than 15 pages long.

80. See, for example, the Energy Policy Act of 2005, 42 U.S.C. §15942, which created statutory CEs for certain types of oil and natural gas development projects. Other legislation, such as the Healthy Forests Restoration Act of 2003, has created statutory CEs for forestry projects for hazardous fuel reduction that meet certain conditions.

81. On the frequency of litigation regarding the “significant” threshold, see Bear, *supra* note 32. The practice of “impermissible segmentation” occurs when agencies divide up otherwise “significant” federal actions into multiple NEPA analyses such that they no longer amount to a “significant” action.

During this era, the unit costs of infrastructure development in the United States also increased significantly. The increases were not uniformly distributed. In the highway sector, for instance, prior to 1970, project costs per centerline mile were relatively similar across regions, while after 1970, large regional disparities emerged.⁸² The transit sector has exhibited uniquely high capital cost inflation in the United States,⁸³ and produces eye-popping estimates today.

In the energy sector, power generation projects in more mature sectors have shown similar real cost growth post-1970, such as coal generation⁸⁴ and hydroelectric projects.⁸⁵ Much more recently, studies have attempted to compare project costs and refine estimates for U.S. electricity transmission projects.⁸⁶ For the development of nuclear power

projects, unique in both their scale and degree of local opposition, cost escalation has been far greater in the United States relative to projects in Europe.⁸⁷

There is very strong evidence of Baumol's cost disease in the U.S. construction sector, indicating that unit costs will likely continue to outpace inflation in the future.⁸⁸ Both labor and total factor productivity data indicate that the construction sector became more productive through the 1950s and 1960s, but since 1970 has become significantly, and consistently, *less* productive while the broader U.S. economy became significantly more productive, to the extent that value added per worker in construction is 40% lower in 2020 than in 1970.⁸⁹

Measuring the timing and quantum of long-term cost trends on large infrastructure projects is challenging due to technology development within sectors (particularly energy) and the idiosyncratic nature of very large public works. Certainly the prevalence of very large cost overruns on megaprojects, separate from development cost inflation generally, is a global phenomenon that is the subject of a wide body of research.⁹⁰

However, in those sectors where there is clear data, such as highways, studies of cost inflation before the mid-1970s do indicate that cost inflation in that subsector clearly began to accelerate in the late 1970s and early 1980s.⁹¹ The average costs of heavy rail and light rail transit (LRT) systems built in the 1960s and 1970s compared to more recent systems also show signs of significant real unit cost growth

See *Oak Ridge Environmental Peace Alliance v. Perry*, 412 F. Supp. 3d 786, 831-32 (E.D. Tenn. 2019), for a recent case.

82. LEAH BROOKS & ZACHARY D. LISCOW, *INFRASTRUCTURE COSTS* 34 (2019).

83. For recent studies illustrating that U.S. rail transit project costs are a global outlier, see PAUL LEWIS, ENO CENTER FOR TRANSPORTATION, *ON THE RIGHT TRACK: RAIL TRANSIT PROJECT DELIVERY AROUND THE WORLD* 9 (2022) (demonstrating average U.S. cost per mile for primarily tunneled projects of \$1,347 compared to \$292 for South Korea or \$271 for Chile), and ERIC GOLDWYN ET AL., NEW YORK UNIVERSITY MARRON INSTITUTE OF URBAN MANAGEMENT, *TRANSIT COSTS PROJECT: UNDERSTANDING TRANSIT INFRASTRUCTURE COSTS IN AMERICAN CITIES* (2023) ("According to our database of more than 900 projects in 59 countries . . . the United States is the sixth most expensive country in the world to build rapid-rail transit infrastructure." The study further notes that even this ranking is misleading, because the five countries with higher unit costs than the United States all have projects that are more than 65% tunneled, whereas only 37% of the total track length is tunneled in the United States.).

84. Project cost inflation in the energy sector is complicated by technological change and productivity improvements. For coal generation projects, see Paul L. Joskow & Nancy L. Rose, *The Effects of Technological Change, Experience, and Environmental Regulation on the Construction Cost of Coal-Burning Generating Units*, 16 RAND J. ECON. 1 (1985) (finding that coal generation capital costs per kilowatt declined up until the late 1960s, then climbed substantially during the 1970s and 1980s. "These cost increases appear to reflect the costs of responding to environmental regulation, not otherwise accounted for in the specification, increased construction times and declining construction productivity.").

85. GBADEBO OLADOSU & COLIN SASTHAV, OAK RIDGE NATIONAL LABORATORY, *HYDROPOWER CAPITAL AND O&M COSTS: AN EXPLORATION OF FERC FORM 1 DATA* (2022) (finding that real capital costs were relatively stable for very large (30 megawatt (MW) plus) hydroelectric facilities, but significantly higher for smaller facilities between 1994 and 2020). Measurement of cost trends for hydropower projects may also be complicated because very few new, large hydroelectric facilities have been built in the United States since NEPA became law. See Gbadebo Oladosu et al., *Costs of Mitigating the Environmental Impacts of Hydropower Projects in the United States*, 135 RENEWABLE & SUSTAINABLE ENERGY REVS. 135 (2021) (finding the environmental mitigation costs for New Stream-Reach Development (NSD), which is a hydroelectric facility on a previously un-dammed body of water, account for a very wide range of leveled cost of energy for facilities even after normalizing for plant capacity. "However, due to environmental concerns with developing relatively unaltered waterways, there are more significant costs and complications associated with this category of development. As such, only 5 of the 118 recent hydropower facilities commencing operation were NSDs.").

86. In the United States, a high-voltage transmission investment boom ended in the late 1960s, and investment declined up through the mid-1990s. Since then, investment has grown significantly. See Energy Information Administration, *Investment in Electricity Transmission Infrastructure Shows Steady Increase*, TODAY IN ENERGY (Aug. 26, 2014), <https://www.eia.gov/todayinenergy/detail.php?id=17711> (showing a fivefold increase by investor-owned utilities in transmission infrastructure between 1997 and 2012). The integration of intermittent renewable sources of generation has increased investment in transmission, though cost estimates for projects vary significantly. See, e.g., JUAN ANDRADE & ROSS BALDICK, UNIVERSITY OF TEXAS AT AUSTIN ENERGY INSTITUTE, *ESTIMATION OF TRANSMISSION COSTS FOR NEW GENERATION* (2017) (illustrating challenge by comparing Competitive Renew-

able Energy Zone project in Texas at average cost of \$2,500 per MW-mile with the Sunrise Powerlink project in California at average cost of \$16,000 per MW-mile). See also ENERGY INFORMATION ADMINISTRATION, *ASSESSING HVDC TRANSMISSION FOR IMPACTS OF NON-DISPATCHABLE GENERATION* (2018) (citing a recent study of high-voltage direct current (HVDC) transmission network with an assumed cost per MW-mile of between \$700 and \$4,400).

87. Jessica R. Lovering et al., *Historical Construction Costs of Global Nuclear Power Reactors*, 91 ENERGY POL'Y 371 (2016).

88. Omar Sweil, *Long-Run Construction Cost Trends: Baumol's Cost Disease and a Disaggregate Look at Building Material Price Dynamics*, 144 J. CONSTR. ENG'G & MGMT. (2018). Baumol's cost disease occurs in a relatively less productive industry as labor cost increases outpace productivity gains, leading to long-term real cost growth. The author identifies clear signs of long-term Baumol's cost disease in the U.S. construction sector, which have not been offset by declines in building material costs. The conclusion follows that planners should account for this trend of construction-sector long-term real cost growth in project decision frameworks.

89. AUSTAN GOOLSBEE & CHAD SYVERSON, *THE STRANGE AND AWFUL PATH OF PRODUCTIVITY IN THE U.S. CONSTRUCTION SECTOR* (2023).

90. See, e.g., Bent Flyvbjerg, *Introduction: The Iron Law of Megaproject Management*, in THE OXFORD HANDBOOK OF MEGAPROJECT MANAGEMENT 1 (Bent Flyvbjerg ed., Oxford Univ. Press 2017) (explaining the "Iron Law" of megaprojects being "over budget, over time, under benefits, over and over again"). Large cost overruns for large infrastructure projects are by no means limited to the United States. See Bent Flyvbjerg et al., *How Common and How Large Are Cost Overruns in Transport Infrastructure Projects?*, 23 TRANSP. REVS. 71 (2003), for a comparison of cost overruns on 258 transport megaprojects in mostly Europe and North America. Relative to Europe, cost overruns were found to be higher in North America for rail projects and lower for road projects, but the differences were nonsignificant.

91. See BROOKS & LISCOW, *supra* note 82, for a study of highway unit costs using pre- and post-1970 data. ALTSHULER & LUBEROFF, *supra* note 70, at 243-44 compare data from multiple studies to show that real unit costs for highways "appears to have increased only slightly from the 1950s through the 1970s" but then "increased by more than 600 percent in the 1980s and early 1990s."

in that sector.⁹² Measuring similar cost inflation for greenfield airport projects is difficult because very few greenfield airport megaprojects have been built in the United States since NEPA became law.⁹³

Leah Brooks and Zachary Liscow studied U.S. infrastructure cost trends and the causes of cost inflation using Federal Highway Administration data for freeway costs per mile between 1956 and 1993.⁹⁴ Their analysis found that freeway spending per mile increased more than threefold in real terms over the study period, but that this did not coincide with significant increases in construction material and labor prices, which were roughly unchanged in real terms over the study period. Instead, they identify a confluence of factors that they call “citizen voice,” which is correlated with freeway unit differences over time and between regions in the United States.

The authors found that proxies for citizen voice, such as income levels and housing prices, nearly entirely statistically explain the rise in construction costs, though this is not primarily driven by the cost of land. Further, covariates of citizen voice, such as local income levels, in particular explain a large part of the temporal increase in U.S. freeway unit costs, and this correlation is specific to the period after 1970.⁹⁵ The authors also found that measurements of a highway’s use of structures and “wiggleness” also increased after 1970, suggesting that local citizens had more leverage to change projects and increased structural costs.

More recently, NEPA reform as it relates to infrastructure costs and the ability of the federal government to deliver projects for its infrastructure spending has been addressed by the Barack Obama, Trump, and Biden Administrations. The Obama Administration made several reforms to NEPA’s administrative process and proposed some others.⁹⁶ Despite a herculean effort to streamline and track permitting for his American Recovery and Reinvestment Act

(ARRA) projects,⁹⁷ President Obama would later lament that “there’s no such thing as shovel-ready projects.”⁹⁸

D. Difficulties Appraising the Costs and Benefits of NEPA

Large cost overruns on major infrastructure projects are certainly a global phenomenon that is not unique to the United States, and international comparisons of infrastructure development cost inflation introduce a host of other confounding variables. However, there is a considerable amount of evidence that cost overruns and cost inflation on large energy and transportation infrastructure projects have been uniquely pronounced in the United States since 1970. It is not possible to attribute that trend to a single law, even one that impacts such a broad range of state actions such as NEPA. Nor would such a causal relationship, if it could be demonstrated, necessarily capture more than a fraction of the costs or benefits of a law like NEPA, compared to the counterfactual world in which a law like NEPA did not exist for the past half-century.

In that counterfactual world in which NEPA never became law, or, more specifically, in which the *Calvert Cliffs*’ decision treated §102 of NEPA similarly to §101, the United States could have higher or lower infrastructure costs. It could also have more or less infrastructure, higher or lower infrastructure quality, more or less energy independence, a bigger or smaller economy, and a higher or lower population. Likewise in that counterfactual world, a wide range of environmental metrics like air or water quality, or even carbon emissions, could be better or worse off without NEPA.

On the margin, however, we do know that NEPA has largely been a net *benefit* to the environment of the United States, and most environmental or environmental law scholars that have written about NEPA have concluded the same.⁹⁹ Yet, such a broad set of societal impacts cannot be causally linked to NEPA absent our counterfactual non-NEPA world. We know that NEPA is probably a net benefit to the U.S. environment simply because we can see that it requires agencies to account for environmental impacts

92. For an aggregation of light rail cost trends across multiple studies, and anecdotal comparisons of unit costs for major heavy rail transit projects, see ALTSHULER & LUBEROFF, *supra* note 70. Their estimations include a 37% increase in real unit costs for U.S. light rail projects from the 1980s to the 1990s.

93. *Id.* Denver International Airport is the exception here. The constant-dollar cost of that project more than doubled between when voters approved of the project in the late 1980s and when it was completed six years later.

94. BROOKS & LISCOW, *supra* note 82.

95. *Id.* Brooks and Liscow were unable to find evidence or unable to test for some additional hypotheses or factors that could contribute in part to the observed increase in U.S. infrastructure costs. These include local construction market concentration, government fragmentation and quality, increased use of labor, and economies of scale, among others.

96. See, e.g., David J. Hayes, *Leaning on NEPA to Improve the Federal Permitting Process*, 45 ELR 10018 (Jan. 2015) (providing specific recommendations based on the Steering Committee on Federal Infrastructure Permitting and Review Process Improvement to streamline multiple-agency review challenges in NEPA). For a review of Obama Administration efforts to streamline and track NEPA review, including the creation of the Federal Infrastructure Projects Permitting Dashboard, see Helen Leanne Serassio, *Legislative and Executive Efforts to Modernize NEPA and Create Efficiencies in Environmental Review*, 45 TEX. ENV’T L.J. 317 (2015).

97. CEQ, *American Recovery and Reinvestment Act of 2009 & NEPA*, https://ceq.doe.gov/ceq-reports/recovery_act_reports.html (last visited Aug. 7, 2023). CEQ tracked every NEPA study and action associated with ARRA-funded projects, and made quarterly reports to Congress. The final report tallied 841 complete EISs and 18 still pending. Including CEs and EAs, CEQ reported that 275,636 federal permitting actions were associated with ARRA projects. Given rates of EIS completion, it follows that many of the actions associated with the 841 EIS actions involved ARRA funding to projects that already had a completed EIS, rather than an EIS completed in order for the project to receive ARRA funding.

98. Peter Baker, *Education of a President*, N.Y. TIMES (Oct. 12, 2010), <https://www.nytimes.com/2010/10/17/magazine/17obama-t.html>.

99. See TAYLOR, *supra* note 69, for a full articulation of the reasoning here, that by making agencies study environmental impacts, NEPA will naturally lead them to mitigate impacts better. See also Bradley Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 COLUM. L. REV. 903 (2002) (“NEPA’s supporters argue that this combustible blend of information, transparency, and political accountability creates powerful pressures on agency decisionmakers to avoid the most environmentally damaging courses of action, and to mitigate environmental harms when it is cost effective to do so.”).

and assess project alternatives, and it is perfectly reasonable for us to conclude that this will induce less environmentally impactful actions on the margins. We can then also point to a wide range of U.S. environmental metrics that have markedly improved since NEPA became law. It is reasonable to attribute some of those environmental improvements to NEPA, despite the fact that it would be impossible to demonstrate a clear causal relationship between a broad procedural law and broad societal outcomes such as those environmental metrics.

The same consideration must be given to NEPA's broader societal costs. Yet, this treatment is rare in prior studies of NEPA.¹⁰⁰ This study and others can gather some indicators of NEPA's costs, but will never be able to account for all of the indirect costs of a law with NEPA's scope. We can see, however, that NEPA's administrative and judicial process gives individuals with the motivation and resources to litigate (or threaten litigation) the ability to delay or potentially enjoin large, environmentally impactful projects. It is perfectly reasonable to conclude that this widely distributed veto power would create a host of second- and third-order effects on the cost of development and determine whether development occurs at all.

E. Existing Empirical Studies of NEPA Practices and Litigation

Despite those challenges, there is a significant body of research on the legal and administrative implications of NEPA. Topics of study include the frequency at which NEPA cases are brought,¹⁰¹ how long it takes to prepare an EIS,¹⁰² and how limiting factors like agency turnover and inadequate budgets lead to delays in agency implementation of the NEPA review process.¹⁰³ However, these studies have tended to focus on the processes agencies use to comply with NEPA and what factors courts use to determine whether compliance was adequate.

There are unfortunately very few public, aggregated sources of data on NEPA process durations and costs, and even less information available that connects NEPA's administrative actions, NEPA litigation, and actual project

outcomes. A 2014 analysis completed by the U.S. Government Accountability Office (GAO) includes a summary of available agency data, yet is titled *Little Information Exists on NEPA Analyses*.¹⁰⁴ On the subject of NEPA costs and benefits, the GAO report noted that, with few exceptions, "the agencies we reviewed do not routinely track data on the cost of completing NEPA analyses" in reference to only the direct costs of completing the study, let alone the secondary impacts of delays and uncertainty.¹⁰⁵ GAO also used several earlier studies to estimate that the number of NEPA lawsuits has been fairly stable at approximately 100 per year after a decline in the mid-1970s.¹⁰⁶

The U.S. Department of Energy (DOE) has reported some direct costs of NEPA permitting in terms of time and contractors, following reforms that centralized NEPA contracting in 1996. Between 2003 and 2012, the agency reported an average EIS cost of \$5.8 million and an average EA cost of \$110,000, with the EIS cost distribution skewed by some outlier EISs costing more than \$10 million. The average duration was 33 months for EISs and 13 months for EAs. Consistent with other research on NEPA that has examined the prevalence of environmental studies by type, DOE determined that approximately 98% of its NEPA studies consisted of CEs.¹⁰⁷

The best government source of data on the frequency, type, and results of NEPA litigation was collected by CEQ via an annual survey of federal agencies between 2001 and 2013. The survey recorded the number of NEPA lawsuits and injunctions by each federal agency each year. It also collected some data on the types of plaintiffs and case dispositions. It recorded an average of 115 NEPA lawsuits and 32 injunctions per year.¹⁰⁸ While potentially useful in identifying general trends in litigation rates, the CEQ survey data has some inconsistencies across years and agency reports. The data also consist of aggregate agency reports, and litigation is not linked to specific projects or permits.¹⁰⁹

Most of the empirical study of NEPA administration and particularly litigation has been based on the Forest Service. The Forest Service produces more NEPA permits and more EISs than any other federal agency, and also receives far more NEPA litigation than any other federal agency, even when controlling for its higher number of permits.¹¹⁰ Because of this, the Forest Service today collects far more detailed data than any other federal agency on NEPA permitting at every level and even on litigation.¹¹¹ A 2006 study found that, over the past few decades, Forest Service environmental litigation was concentrated in the

100. Examples abound of studies that significantly discount NEPA's direct and indirect costs, in time or money, because of a lack of clear data demonstrating a causal relationship between the process and those costs. See, e.g., Memorandum from Congressional Research Service on Questions Regarding the Report *Two Years Not Ten Years: Redesigning Infrastructure Approvals* to House Committee on Transportation and Infrastructure, Subcommittee on Highways and Transit (June 7, 2017), <https://sgp.fas.org/crs/misc/twonot.pdf>. The report, which is responding to a criticism of NEPA and permitting more broadly for delaying infrastructure projects, "identified a number of factors that make it difficult to support statements and assumptions . . . related to the effect that permitting and environmental review may have on infrastructure projects." *Id.* at 5. Those limiting factors included a lack of data, the difficulty of measuring what constitutes a "delay" above and beyond normal planning, and the difficulty accounting for other state or local issues that could cause delays on infrastructure projects.

101. See JAY E. AUSTIN ET AL., ENVIRONMENTAL LAW INSTITUTE, JUDGING NEPA: A "HARD LOOK" AT JUDICIAL DECISION MAKING UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT (2004).

102. See deWitt & deWitt, *supra* note 19.

103. See Ruple et al., *supra* note 20.

104. GAO, *supra* note 36.

105. *Id.* at 11.

106. *Id.* at 19.

107. DOE, NEPA LESSONS LEARNED (2013).

108. CEQ, NEPA LITIGATION SURVEYS: 2001-2013 (2014).

109. For additional analysis using the CEQ annual NEPA litigation survey data, see also Ruple & Race, *supra* note 20.

110. Adelman & Glicksman, *supra* note 20, at 30 use U.S. Environmental Protection Agency EIS database data to estimate that the Forest Service produces approximately 22% of all federal EISs, yet has a litigation rate of more than 30%, which is the highest of any federal agency.

111. See Ruple et al., *supra* note 20, at 288 for a summary of Forest Service NEPA permit tracking and data collection efforts.

Pacific Northwest, that logging was the focus of most lawsuits, that seven in 10 lawsuits against the Forest Service used NEPA as a statutory basis, and that one in six lawsuits ended in a settlement.¹¹² These data provide a starting point, though its regional focus, along with the history of litigation surrounding federal public timber sales, may be difficult to generalize to other agencies or regulated sectors.

A 2010 study that used survey data from Forest Service officials found that “likely environmental impacts” was often ranked as less important than other factors in determining whether an EIS is needed for a project. Those factors that tended to be ranked higher included “likelihood of litigation,” “degree of public interest/controversy,” and “political attention.”¹¹³ A 2014 study of Forest Service litigation results extended the analysis from the prior 2006 study and found that the rate at which the Forest Service “won” litigation had declined significantly since 2002, and that the rate of settlement had nearly doubled to almost 33%.¹¹⁴ A 2018 study focused on the duration of the NEPA litigation process, finding a median time to case disposition of 534 days.¹¹⁵ Finally, a 2022 study focused on the duration of 41,000 Forest Service NEPA actions, rather than litigation per se, but did identify a culture of “litigation aversion” in the Forest Service as one potential source of delay or unwieldy documentation for NEPA permits at the agency.¹¹⁶

More recent scholarship has endeavored to quantify the impact of NEPA litigation on projects or policies. These studies have generally found that the rate of NEPA litigation is declining and that the burden associated with NEPA litigation may be overstated.¹¹⁷ Such studies tend to proceed by looking at the total number of federal actions subject to NEPA in relation to the number of cases filed under NEPA.¹¹⁸

David Adelman and Robert Glicksman created a database of NEPA litigation cases between 2001 and 2015 to study the outcomes of litigation by judicial ideology and presidential administration. They found that NEPA litigation is concentrated by agency and regionally. More than half of district court NEPA cases were filed against either the Forest Service or BLM, and more than half of district court cases were filed in the U.S. Court of Appeals for the Ninth Circuit.¹¹⁹ They found common claims in NEPA litigation to be challenges to the number of alternatives

studied, the cumulative impacts studied, the mitigation measures considered, or the scope of NEPA analysis.

However, no specific type of claim was found to be more or less favorable to plaintiffs, and there was little variation in type of claim filed by agency, circuit court, or between district and appellate courts.¹²⁰ Their study also found dramatic differences in outcomes between NEPA litigation filed against the George W. Bush Administration relative to litigation filed against the Obama Administration,¹²¹ driven in part by “judicial ideology,” or the party alignment of the judge or panel of judges adjudicating the case.¹²² The study’s broad conclusion regarding NEPA litigation, however, was that “a NEPA lawsuit is a rare event and claims that NEPA poses a significant burden have little basis in fact.”¹²³

Adelman and Glicksman also found that local or national environmental groups filed a combined 70% of district court cases and 64% of circuit court cases in their sample, and that environmental plaintiffs won their cases substantially more often than other types of plaintiffs.¹²⁴ The authors concluded that this was an indication of merit-based, rather than strategic, litigation activity. “If environmental plaintiffs were filing cases purely on strategic grounds, instead of the merits, we would expect them to prevail less often than other plaintiffs.”¹²⁵

Another recent study of the NEPA litigation burden was completed by John Ruple and Kayla Race.¹²⁶ The authors combined several sets of public data, including the CEQ NEPA litigation survey data discussed above as well as the CEQ permitting duration data, which we also used for this study.¹²⁷ Their study also concluded that the NEPA litigation burden was not significant: “We found that very few NEPA decisions are challenged in court and that the rate at which NEPA decisions are challenged is declining.”¹²⁸

112. Denise M. Keele et al., *Forest Service Land Management Litigation 1989-2002*, 64 J. FORESTRY 197 (2006).

113. Mortimer et al., *supra* note 19.

114. Amanda M.A. Miner et al., *Twenty Years of Forest Service Land Management Litigation*, 112 J. FORESTRY 32 (2014). The study also found a wide disparity in Forest Service success rates between the U.S. Court of Appeals for the Ninth Circuit and non-Ninth Circuit cases.

115. Denise M. Keele & Robert W. Malmshemer, *Time Spent in Federal Court: U.S. Forest Service Land Management Litigation 1989-2008*, 64 FORESTRY SCI. 170 (2018). The study also found a median time to disposition of one year for settlements.

116. Ruple et al., *supra* note 20, at 330-32.

117. Ruple & Race, *supra* note 20, at 479.

118. See Adelman & Glicksman, *supra* note 20, at 50.

119. *Id.* at 29.

120. *Id.* at 34.

121. *Id.* at 39. For instance, the authors found that NEPA plaintiffs were twice as likely to win their cases at the district court level during the Bush Administration, relative to the Obama Administration. During both the Bush and Obama Administrations, plaintiffs were twice as likely to win at district court if within the Ninth Circuit.

122. *Id.* at 52. This shift in judicial deference between the Bush and Obama Administrations was particularly pronounced for Democrat-appointed judges at the district level and Democrat-appointed majority panels at the appellate level. The concentration of NEPA litigation and Democrat-appointed judges in the Ninth Circuit was also found to influence this finding.

123. *Id.* at 50. The authors summarize their calculations regarding the litigation burden as follows:

The number of cases filed under NEPA has remained relatively constant, with about 100 cases filed in district courts annually (about 35% of which settle) and roughly twenty-five appeals. Given the number of federal actions potentially subject to NEPA is roughly 100,000 or so annually, litigation rates are exceedingly low; even among actions requiring EISs, which pose the greatest potential threats to the environment, on average 20% are challenged and just 13% are actually litigated.

124. *Id.* at 27. “National environmental organizations” in this context included the Sierra Club, the Natural Resources Defense Council, the National Wildlife Federation, and the Center for Biological Diversity, among others.

125. *Id.*

126. Ruple & Race, *supra* note 20.

127. See *infra* Part II for a discussion of our data set, which is a subset of CEQ’s permitting data set. See CEQ, *supra* note 21.

128. Ruple & Race, *supra* note 20, at 500. The authors’ calculations support this conclusion as follows:

Ruple and Race also found that agencies with longer average permitting times tended to have lower rates of litigation, and thus cautioned against efforts to “streamline” permitting under NEPA. “Streamlining NEPA also runs a risk of actually delaying project implementation if, as our analysis suggests, the rate of challenge is inversely related to the time spent on the NEPA analysis.”¹²⁹

F. Research Need

The above review of existing research on the NEPA administrative process and NEPA litigation leaves some clear gaps that may explain some, though not all, of the basic factual disconnects between NEPA’s supporters and its critics.

The main research need that motivated the present study was the lack of a clear study connecting the results of NEPA’s administrative process, the prevalence of litigation, and the characteristics of the projects being studied. Further, prior studies have not correlated all of those factors with the actual outcomes of the projects themselves (i.e., whether they were built, cancelled, or delayed, etc.). Many of the studies cited above have relied on separate sources of data for permits and then litigation, or otherwise used agency self-reported aggregate data. Those sources can and did produce very useful findings, but our goal was to directly link data on infrastructure projects to NEPA studies to lawsuits to outcomes, which has not been done before.

Additionally, many prior studies have taken a very broad approach to estimating the prevalence of NEPA litigation. They do so by dividing the number of cases filed under NEPA (on average just over 100 annually) by the total number of agency actions that *could* be subject to NEPA litigation, which includes CEs and EAs (on the order of tens of thousands of actions). Most of those estimates rationally find that the litigation rates associated with NEPA are “exceedingly low.”¹³⁰

Yet, we find such a calculation underwhelming, and especially so for our purpose, which is to study the impacts of the NEPA process on infrastructure development. The rate of NEPA litigation against *all* NEPA actions is less useful in part because the distribution of actions is extremely skewed. CEs constitute the vast majority of federal actions (upwards of 99%), and most of these permits are relatively short in duration for relatively minor actions.

CEs do vary in duration and are subject to litigation, but lumping CEs in with major federal actions that do have environmental impacts, and thus require an EIS, would

significantly distort any attempt to ascertain the impact of litigation on infrastructure development. It would also distort a study of the NEPA process, because CEs are referred to as a categorical *exclusion* because they are a certification that an action is not subject to that very process. For this reason, NEPA administration and litigation specific to EISs, or EISs and EAs, separate from CEs, is an important area of study.

We also aimed to study EISs because the projects they study are simply important. These are the major federal actions and infrastructure projects that shape regional economies and the well-being of future generations. They are clearly the most important projects that we undertake, both economically and environmentally.

The EIS projects are also uniquely important to study because of the disparate treatment U.S. courts have taken between the substantive §101 of NEPA, and the procedural §102 of the Act. NEPA supporters have long lamented the fact that courts have treated §101 of NEPA “as noble rhetoric having little practical significance.”¹³¹ If §101 were treated by the courts similarly to NEPA’s procedural requirements, the federal government’s actions could be challenged in court on the grounds that they fail to “assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings,” or to “achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life’s amenities.”¹³² As a practical matter, it is not surprising that the courts chose not to treat §101 similarly to the procedural requirements of §102, but both NEPA’s supporters¹³³ and NEPA’s critics¹³⁴ have argued that such a balance is untenable.

The EIS projects under NEPA are important because these are the projects that test NEPA’s balance in the courts. These are the actions that, according to the federal government, will have “significant environmental impacts,” but that must be undertaken in some form nonetheless. Does NEPA affirmatively prevent the federal government from harming the environment, or simply require agencies to study those impacts before they cause them? The nuanced answer to that question can be found by studying EISs, the projects they appraise, and the litigation challenging them.

We also aimed to focus our study specifically on transport and energy infrastructure projects. These are typically the areas of interest in debates over NEPA reform, but as noted in the prior section, most of the detailed study of NEPA permits and litigation have been on the Forest Ser-

[W]e estimated that, over the thirteen year study period, only about 0.22% of NEPA decisions (or roughly 1 in 450) were challenged in federal court. As previously noted, this should be viewed as a rough estimate due to challenges extrapolating the total number of NEPA documents from the number of EISs.

Id. at 503-04.

129. *Id.* at 521. The authors’ calculations supporting this conclusion (*id.* at 497-98) are a comparison of the rates of EIS litigation by federal agency calculated in Adelman & Glicksman, *supra* note 20, with the average EIS permit durations by federal agency reported by CEQ, *supra* note 21.

130. *See, e.g.*, Adelman & Glicksman, *supra* note 20, at 65.

131. Caldwell, *supra* note 46, at 205.

132. 42 U.S.C. §4331(a).

133. *See, e.g.*, Caldwell, *supra* note 46; Emery, *supra* note 46. Karkkainen, *supra* note 99, refers to NEPA being limited to a procedural requirement for the EIS as “both its singular genius and fatal flaw.”

134. *See, e.g.*, James W. Coleman, *Pipelines & Power-Lines: Building the Energy Transport Future*, 80 OHIO STATE L.J. 263 (2019). The article is not a critique limited to NEPA, but on the issue of substantive or procedural approaches to environmental protection, the author argues that “climate campaigners would be better served by pursuing substantive regulations that would surgically target fossil fuels rather than imposing new energy transport procedures that will have collateral impacts on renewable power transmission.”

vice. Even beyond the Forest Service, the land management agencies complete many permits under NEPA and attract the most litigation.¹³⁵ This is not surprising, given the environmental importance of area management plans and forestry projects and the significance of public lands issues in the western United States.

However, we hypothesize that the practicalities of NEPA permitting and litigation are somewhat different for an area management plan on the one hand and a large transport or energy project, entailing a web of interlocking contracts and hundreds of millions or even billions of dollars of capital expenditures, on the other. In infrastructure development, the potential costs caused by an injunction may be much greater, and if so, the impact of the uncertainty of litigation outcomes would also be much greater, especially for projects being privately financed. If the projects have large budgets or, even more importantly, large amounts of federal funding, there may be a larger incentive for stakeholders to intervene to demand mitigations.

The high cost of injunctions and the high incentive to intervene may also combine to incentivize project sponsors to opt for settlements more so than in other sectors. The costs of inflation due to permitting delay would also naturally be much greater for large capital projects. Finally, for public works, there may be greater incentives for strategic behavior with NEPA litigation, as project opponents need not delay projects indefinitely, but only until the next election.

For all of these reasons, we aimed to study infrastructure development and permitting in isolation, and we studied the EISs.

II. Data and Methodology

Our primary source of data for this study was a database published by CEQ of 1,161 EISs for federal projects.¹³⁶ Each of the projects in the database published a final EIS between 2010 and mid-2018. We then narrowed this data set to focus only on large infrastructure projects in the energy (171 projects) and transportation (184 projects) sectors. The original CEQ data set included the duration of each phase of the EIS development process for each project, the lead agency and department for the project, and the state or states in which the project is located. For a subset of the projects, the CEQ data also included the number of pages in the EIS.

We supplemented the CEQ data set in several ways. We added variables to indicate whether a project received a supplemental EIS, whether the project was included in the Federal Permitting Dashboard, and whether the project is located in a state with its own potentially restrictive state environmental law.¹³⁷ We also coded each of the projects by

subsector. Figure 1 (next page) shows the breakdown of our data set by various subsectors of transportation and energy infrastructure projects.

We then coded each of the projects based on their current status as of fall 2022. Projects were coded based on whether they were built and in operation, still under construction, still in some form of planning or predevelopment, or cancelled at that time. Approximately 47% of the projects in the data set were completed as of fall 2022. Twenty-four percent of projects were still under construction, while 16% were still in predevelopment and 14% had been cancelled. Figure 2 (page 10851) shows the data set based on the status of each of the projects in fall 2022.

Finally, each of the projects in the data set were checked for litigation associated with the permitting process. When litigation was identified, it was coded based on whether the litigation referenced NEPA, or a state environmental law but not NEPA, or another federal statute but not NEPA. We identified litigation associated with 100 projects, or approximately 28% of our data set. Of those projects that were litigated, the vast majority (89 lawsuits) referenced NEPA.

We used Nexis Uni, LexisNexis, and Westlaw databases to find litigation associated with a given project. For Nexis Uni, we used a general search for the project name in the database, and identified litigation that included the same or similar project name occurring at the same time and in the same geographic region as the listed project. We used a similar screening method for Westlaw and LexisNexis, but applied a two-step process for each database. First, we searched for published and unpublished opinions that included the name of the project as listed in the database. However, to account for litigation that was commenced but ended without an issued opinion from the judge (such as those that are settled or dismissed), we incorporated a second inquiry to include jury verdicts, settlements, and attorney briefs that named the project in question.

III. Results and Discussion

The primary purpose of our investigation was to determine whether there is any correlation between the characteristics of a large infrastructure project, such as the type of project or time spent developing the environmental study for the project, and the rate of litigation against the project. Because we also recorded the project's current status, we also investigated correlations between the aforementioned variables and project cancellation or completion rates.

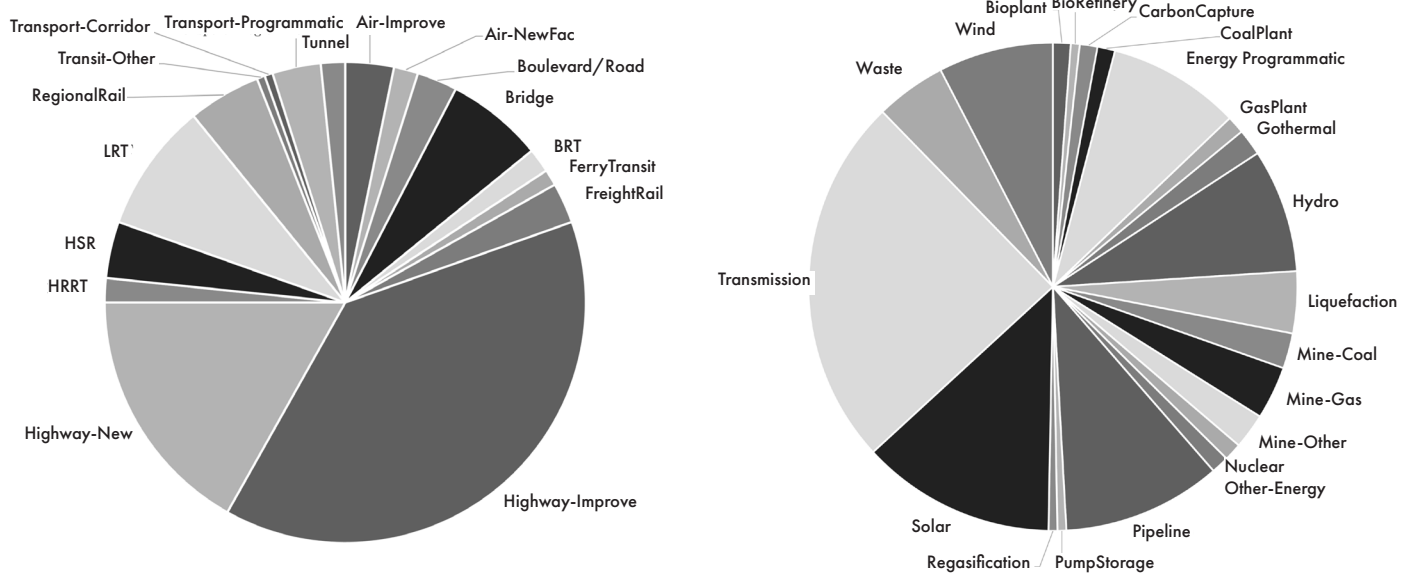
135. Adelman & Glicksman, *supra* note 20, estimate that the Forest Service, BLM, U.S. Fish and Wildlife Service, and National Marine Fisheries Service constitute nearly two-thirds of all district court NEPA cases.

136. See CEQ, *supra* note 21.

137. We borrow the restrictive state indicator from BROOKS & LISCOW, *supra* note 82. Brooks and Liscow classified the restrictiveness of state environmental

laws based on four factors: (1) the degree to which uninjured parties can challenge a project in court; (2) the threshold for triggering state environmental review; (3) the degree to which private actions subject to government permitting also require environmental review; and (4) the procedural opportunities for citizen involvement under state environmental laws. Restrictive states under those criteria are California, Massachusetts, Minnesota, New York, and Washington.

Figure 1. EIS Data Set by Subsector



A. Results Summary: Litigation and Development Outcomes

We identified development-stage litigation against 100 of the 355 EIS projects included in our data set, or an overall litigation rate of just over 28%, which is higher than prior estimates of the rate of environmental litigation associated with EISs.¹³⁸ Of the projects associated with a lawsuit, 89% of them included at least one lawsuit that claimed a violation of NEPA. Of the remaining 11% of projects that were associated with litigation, 7% included claims under another federal statute but not NEPA,¹³⁹ and 4% included claims against a State Environmental Protection Act (SEPA)¹⁴⁰ but not NEPA.

The development outcomes from our data set were more striking. Of the 355 EIS projects in our data set, less than half of them are associated with a complete, operational infrastructure project at the time that this study was completed.¹⁴¹ Of the remainder, 14% of the projects

in our data set have been outright cancelled, while the remaining 40% of projects are either still under construction or still in planning and predevelopment.¹⁴² This result is remarkable because all of the projects in our data set had published a final EIS by 2018, more than four years prior to the start of this study. The completion of a final EIS means that most of the *administrative* requirements of environmental permitting under NEPA had already been completed, with years and likely millions of dollars of direct costs already invested in early project planning and permitting at that point.

Of course, the physical construction requirements of various projects mean that construction timelines, irrespective of environmental permitting, will vary significantly. Our data set also spans more than eight years of final EISs. Nevertheless, it is surprising that less than half of all of that environmental administration has, to date, resulted in an operating infrastructure project, and more than one-quarter of the projects are either still in predevelopment or already cancelled. Figure 3 (page 10852) categorizes the projects in our data set that have completed a ROD under NEPA, based on the date of the ROD, the duration of the permitting process in years, and the project's current status.

B. Sector Comparison—Permit Durations and Litigation Rates

The sectors of projects included in this study vary significantly in the average duration of permitting, and in their rates of litigation. Figure 4 (page 10853) is a chart of each sector and the average permit duration in years, and rate of

138. See, e.g., Adelman & Glicksman, *supra* note 20, at 50 (“even among actions requiring EISs, which pose the greatest potential threats to the environment, on average 20% are challenged and just 13% are actually litigated”). See also Ruple & Race, *supra* note 20, at 505 (estimating that 16.1% of final EISs resulted in a court decision based on the adequacy of the EIS. The authors note that this would not necessarily represent all of the projects that were litigated, but only those that were litigated and made it to a final court ruling.).

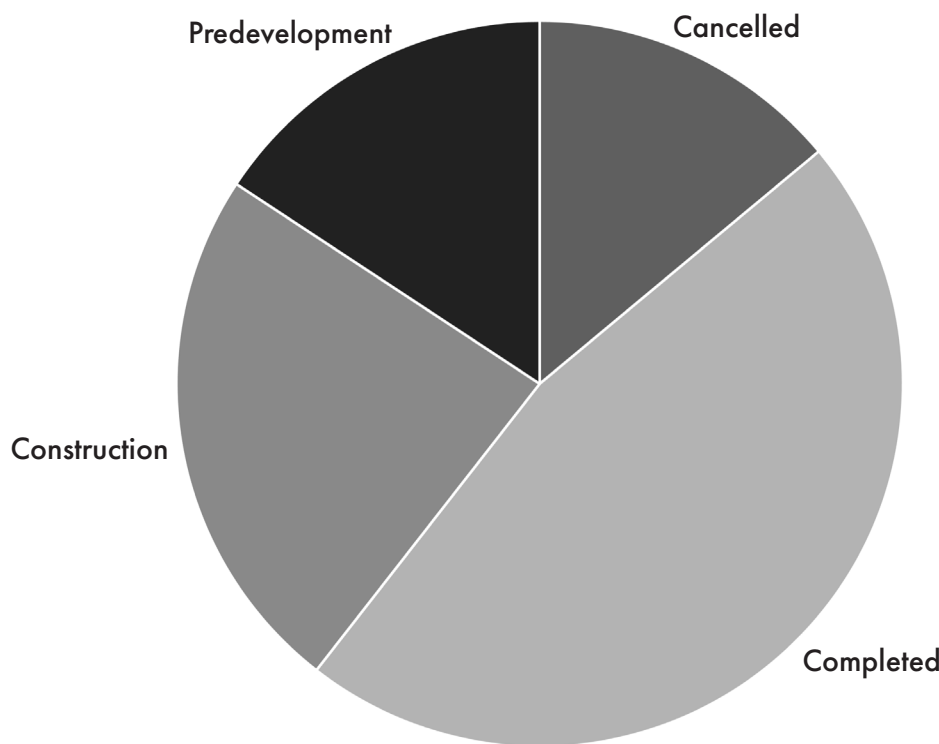
139. Litigation that did not include a NEPA claim were limited to several other federal statutes, including the Natural Gas Act, tribal law claims, §4(f) of the U.S. Department of Transportation Act, and inverse condemnation challenges.

140. Federal law prohibits challenges to federal projects under SEPAs, but some states allow litigation against federal projects under their state environmental permits in areas not covered by the NEPA process. The few projects in our data set that were litigated under state laws but not NEPA were in California or Hawaii.

141. The current status of projects in our data set were recorded between spring and fall 2022. Our data set also includes some programmatic environmental permits in both the energy and transportation sectors, a small number of which were not associated with a specific infrastructure project. In those cases, the permit was excluded from our project status analysis.

142. We were conservative in delineating predevelopment and cancelled projects. Projects were only recorded as cancelled if there was a formal cancellation announcement, while others were recorded as still in predevelopment even if there has been little recent activity. In practice, some projects that are formally cancelled are later “revived” and begin predevelopment again.

Figure 2. Project Data Set by Status (Updated Fall 2022)



litigation as a percentage of the total number of projects in that sector.

The sector averages for litigation rates include some noteworthy results. Of the major infrastructure sectors, solar energy projects have the highest rate of litigation: 64% of all solar projects in the data set are associated with litigation. Similarly, 50% of LRT projects were also subject to litigation, compared to just 20% of highway improvement projects and 26% of new highway construction projects. At 33% and 29%, respectively, heavy rail transit and high-speed rail (HSR) were litigated at a higher rate than freight rail projects (20%). Pipelines were, unsurprisingly, often litigated at a rate of 50%, but transmission lines were also often litigated (31%), as were wind energy projects (38%). (Technically, the highest rate of litigation was for pump storage hydroelectric projects at 100%, but there is only one such project in our data set.)

Beyond the rates of litigation alone, there is also a marked relationship between the duration of environmental studies and the rates of litigation, delineated between our transportation sectors and energy sectors. Figure 4 plots all of the major sectors¹⁴³ in our data set, according to the average permit duration in years on the x-axis and the rate of litigation on the y-axis.

There is an observable divergence between energy projects, which have shorter average permit durations but higher rates of litigation, and transportation projects, which have

lower rates of litigation but very long permitting timelines on average. Solar energy projects, for instance, spend just 2.4 years on average completing the NEPA process, but have a litigation rate of nearly two-thirds. Meanwhile, new highway projects in our data set have a litigation rate of just 26%, but spend 9.6 years on average completing the NEPA process.

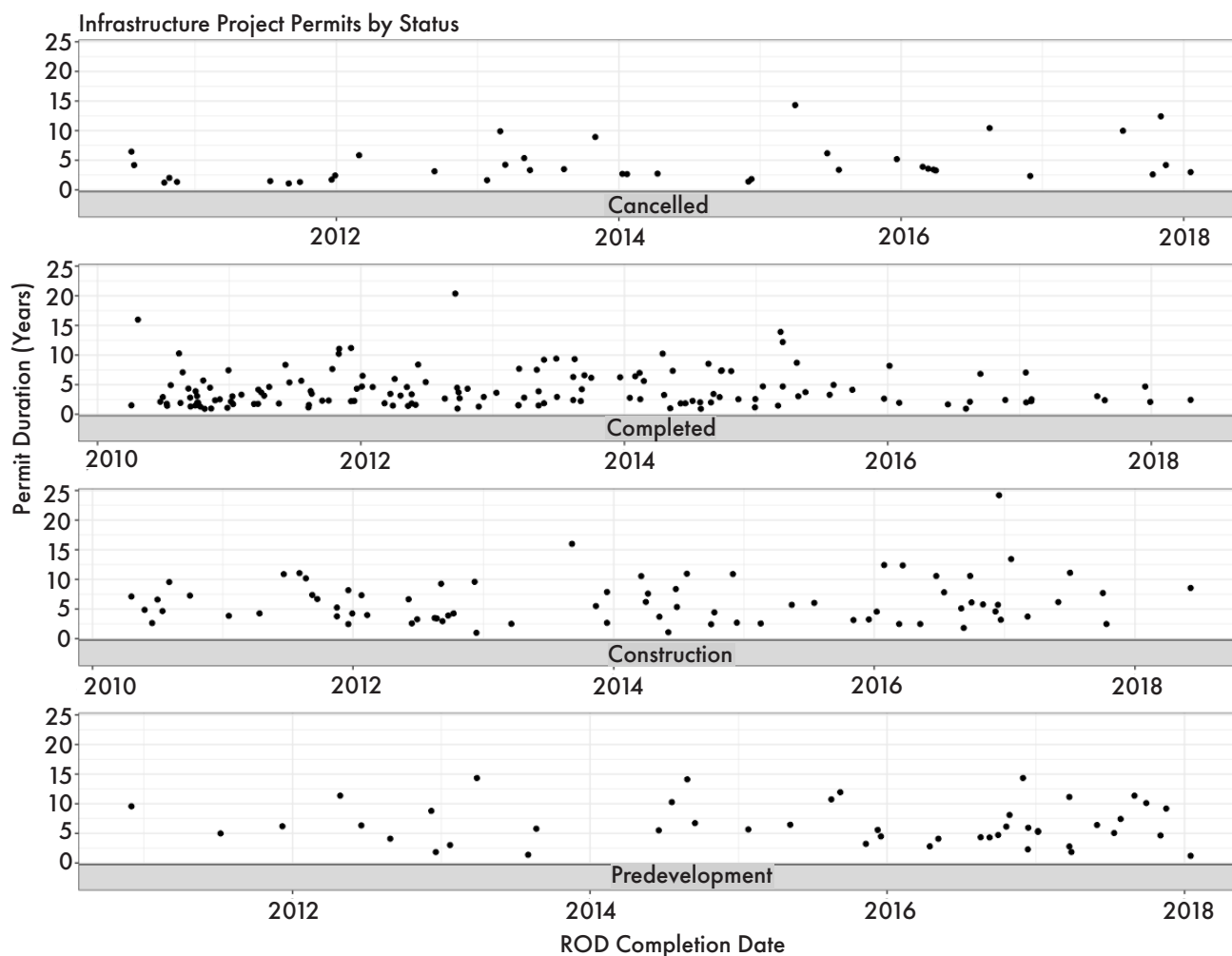
We attribute some of this divergence to very different levels of private investment in greenfield development between the U.S. energy and transportation sectors. Many energy generation or transmission projects are economically viable as stand-alone projects, and private investment in the U.S. energy generation sector is high as a result. Most large transportation projects, however, are publicly financed with high levels of federal subsidies varying by sector.

This difference could impact our results in two ways. First, our data set likely includes a greater proportion of the U.S. transportation sector, while some large energy projects are not included. This is because projects are only required to complete NEPA if they receive federal funding, which is far more prevalent in the transportation sector, or if they require approval by a federal agency because they are on federal land or for another reason. This means that some energy projects that are not on federal property may not be required to complete the NEPA process.

More important, there is clearly a difference in approaches to the federal permitting process between sectors with high levels of private financing and sectors with more public funding. When there is a conflict regarding a project’s environmental study, the lead agency receives comments from stakeholders who challenge the analysis or

143. Several of the smaller sectors in our data set were excluded from Figure 4 for readability because they had zero cases of litigation. Also for readability, we removed the pump storage hydroelectric sector from Figure 4 because it was one project and a 100% litigation rate.

Figure 3. Projects With RODs by Current Status



claim that additional study is needed. Project proponents must then decide whether to revise the study to address the claimed deficiency, or to finalize the study and accept the risk that the study could be challenged by litigation and eventually enjoined based on the claimed deficiency. This risk of environmental litigation is extremely difficult to appraise *ex ante*.¹⁴⁴

In the energy sector, a higher degree of private financing means that there is development capital at risk during the permitting process. Likewise, changes in construction cost inflation or commodity prices could make a privately financed project economically unviable due to a delay. This may create a very strong incentive for project sponsors to move forward and “resolve” permitting risk one way or another for their project, rather than continually extending or revising an environmental study. This may in turn result in the observed shorter permitting durations in those sectors, and higher rates of litigation. Federal and state transportation agencies, meanwhile, may be more inclined to “litigation proof” their environmental studies by con-

tinually revising them in response to comments,¹⁴⁵ as the development capital at risk for most transportation projects is public funding.

There are many other factors that may contribute to both permit durations and litigation risks for projects, but it is noteworthy that even linear energy projects follow the trend identified above, with pipelines having very short average permit durations of just two years, and transmission lines with an average permit duration of just under four years. Somewhat comparable linear transportation sectors, such as highways or rail, tend to have longer average permit durations.

Table 1 (page 10854) includes a sector summary with the litigation rates and average permit duration for the various energy and transportation sectors included in this study.

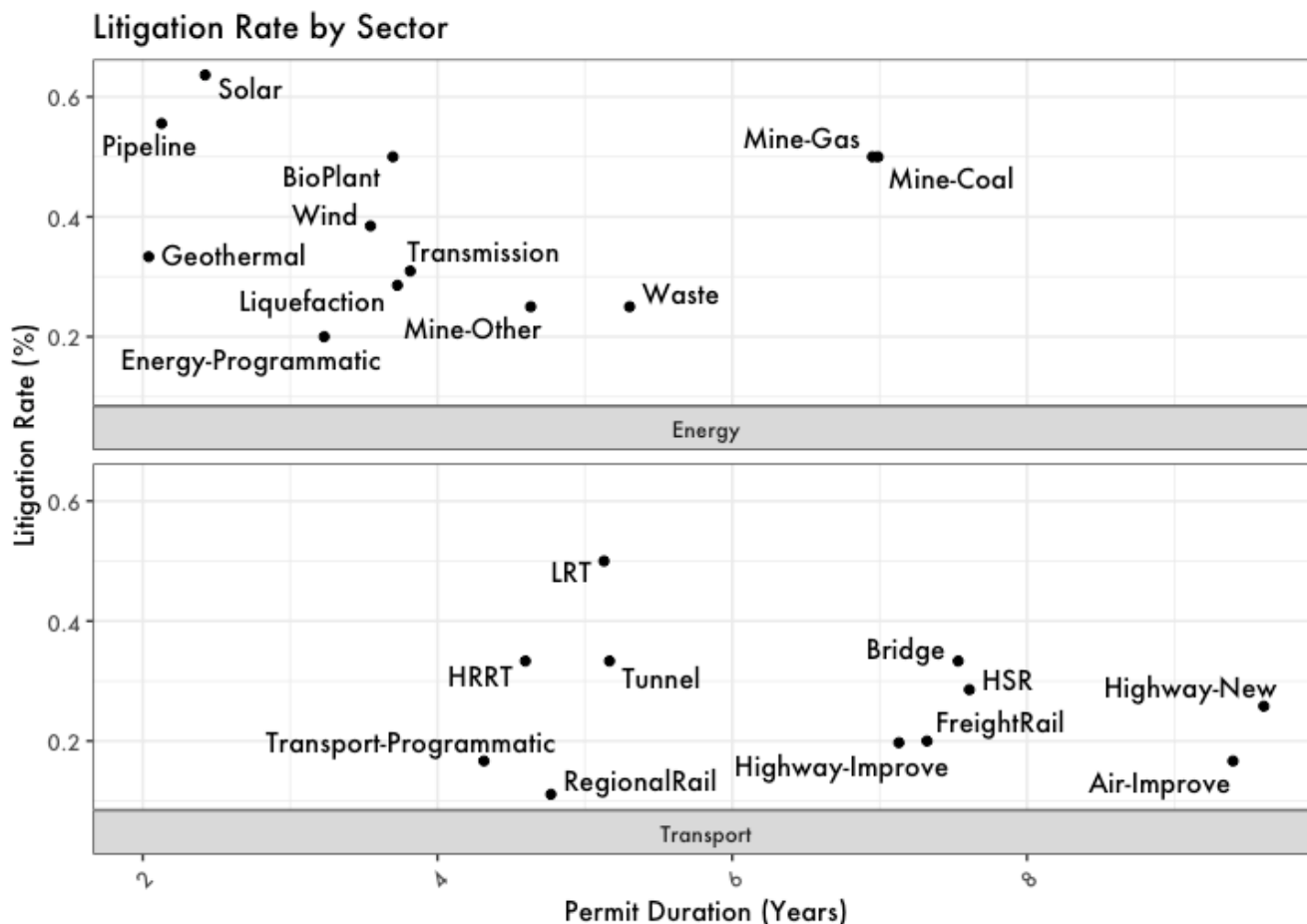
C. Sector Comparison—Cancellation

It is more challenging to compare project rates of cancellation or completion by subsector due to a number of confounding factors, including the differences in physical

144. See *infra* notes 45 to 47 and accompanying text for a description of the procedural game of “cat and mouse” that project proponents navigate during the permitting process with stakeholders that oppose the project.

145. See SMILLIE & SWARTZ, *supra* note 42 and accompanying text, for a discussion of “litigation proofing” during EIS permitting.

Figure 4. Litigation Rates and Permit Durations for Select Sectors



construction requirements between sectors and the range of dates in which the projects in our data set completed a final EIS.

However, there is a similar divergence along the lines of private financing in the energy and transportation sectors in terms of subsector rates of cancellation and completion. Specifically, some subsectors with higher rates of private financing have higher cancellation rates, but also have higher completion rates at the time this study was completed. The transportation sectors, on average, have lower rates of cancellation but higher rates of projects still in predevelopment or under construction.

Figure 5 (page 10856) plots the sectors¹⁴⁶ in our data set, according to the average permit duration in years on the x-axis and the rate of cancellation on the y-axis.

An examination of some of the subsectors with higher numbers of permits illustrates this trend. While solar and wind projects had relatively high rates of cancellation (32% and 31%, respectively), they also had high completion rates (59% and 54%), such that just 9% of the solar projects and

15% of the wind projects in our data set were still in development or predevelopment. Thirty-one percent of transmission lines in our data set are still in development, and just 6% of the pipeline projects are still in development.

This differs widely from the transportation sectors in our data set. For instance, new highway or highway improvement projects in our data set have relatively low rates of cancellation, at 6% and 14% respectively, but also have far lower rates of completion, such that 65% of new highway projects and 46% of highway improvement projects are still in predevelopment or under construction. Likewise, 67% of heavy rail and 69% of LRT projects are still in construction or predevelopment. Bus rapid transit (BRT) projects are a bit of an outlier in Figure 4 in that they have both longer permit times and a high cancellation rate, but there are only three such projects in our data set.

Our broad takeaway is that while the main energy sector projects in our data set have shorter permit times and higher litigation rates, they also have higher resolution rates, in that they were either built or cancelled by the time this study was completed. The transport sectors have longer permit durations and less litigation, but also have many more projects that remain in predevelopment or under construction.

146. For readability, we removed sectors without cancelled projects from Figure 5. For the same reason, we removed coal plants, regasification projects, and carbon capture projects due to their high rates of cancellation, though these sectors constitute only five projects in our data set.

Table 1. Study Data Set by Sector

Sector	Litigation Rate	Average Permit Duration	Count
Airport-Improve	17%	9.40	6
Airport-New Facility	0%	5.10	3
BioPlant	50%	3.70	2
BioRefinery	0%	1.71	1
Boulevard/Road	0%	8.37	5
Bridge	33%	7.53	12
BRT	0%	6.27	3
CarbonCapture	0%	2.09	2
CoalPlant	0%	2.00	2
Energy-Programmatic	20%	3.23	15
FerryTransit	0%	5.97	2
FreightRail	20%	7.32	5
GasPlant	0%	1.67	2
Geothermal	33%	2.04	3
Highway-Improve	20%	7.13	71
Highway-New	26%	9.61	31
HRRT	33%	4.60	3
HSR	29%	7.61	7
Hydro	0%	4.72	14
Liquefaction	29%	3.73	7
LRT	50%	5.13	16
Mine-Coal	50%	6.99	4
Mine-Gas	50%	6.95	6
Mine-Other	25%	4.63	4
Nuclear	0%	6.27	2
Other-Energy	0%	2.70	2
Pipeline	56%	2.13	18
PumpStorage	100%	5.51	1
Regasification	0%	3.39	1
RegionalRail	11%	4.77	9
Solar	64%	2.42	22
Transit-Other	0%	2.14	1
Transmission	31%	3.82	42
Transport-Corridor	0%	4.43	1
Transport-Programmatic	17%	4.32	6
Tunnel	33%	5.17	3
Waste	25%	5.30	8
Wind	38%	3.55	13

As noted above, we attribute some of this differential between energy and transportation projects to the degree of private investment versus public funding, and direct federal funding, between the sectors. However, it is not possible to disaggregate this from the functional differences between the sectors. From an engineering perspective, there are many reasons that a regional rail line would spend more time in construction and predevelopment relative to a pipeline or transmission line, even though they may face similar challenges during the permitting process. Right censoring, or the fact that many of our transportation projects are still in predevelopment, may also account for some of our results. When all is said and done, it could be that highway projects and transmission lines have similar rates of cancellation, but we simply do not observe that now because of the far longer predevelopment timelines of the former.

D. Regression Results

We also completed a series of logistic regressions on the incidence of litigation, and then again on the incidence of project cancellation, among the projects in our data set. The independent variables included in our regressions included the sector of the project, whether or not a supplemental EIS was completed for the project, the amount of time, in years, that the project spent completing NEPA, whether the project was included on the Federal Permitting Dashboard, whether or not the project is located in a restrictive state, and whether the federal agency had published a ROD on the project's permit by the end of the CEQ study period.¹⁴⁷ For our regressions on project cancellation, we also included whether or not the project was litigated as an independent variable.

Appendix 1 includes our logistic regressions on the incidence of litigation, and Appendix 2 includes our logistic regressions on the incidence of project cancellation.¹⁴⁸

1. Regressions on Litigation

Only one of the sectors in our study was shown to be statistically significant and positively correlated with the incidence of litigation: solar energy. While other sectors had varying rates of litigation, none had a statistically significant correlation. The publication of a supplemental EIS for the project was also statistically significant and positively correlated with litigation in all of our regressions.

It is unlikely that the relationship between supplemental EISs and litigation is causal. In other words, an agency's decision to complete a supplemental EIS does not increase the propensity of stakeholders to litigate. Rather, this rela-

tionship simply indicates that agencies may tend to publish a supplemental EIS when they anticipate litigation against the project, and that further "litigation proofing" is necessary. The relationship between public comments on draft EISs, comments on final EISs, the content of supplemental EISs, and claims in environmental litigation may be a useful area for further study, as this relationship between supplemental studies and litigation may be an indication of strategic behavior between federal agencies and project opponents during the environmental permitting process.

2. Regressions on Cancellation

Our logistic regressions on cancellation produced nuanced results. None of the sector-independent variables is statistically significant. Our categorical variable for litigation is statistically significant, with a positive coefficient for all of the regressions in which it is included. This indicates that litigation is correlated with project cancellation.

For almost all of our regressions on cancellation, the duration of the permitting process is statistically significant. This is not altogether surprising, and indicates that, all things considered, longer permitting times are correlated with project cancellation. However, when we include a categorical variable for projects that published a ROD before the end of the CEQ study, that categorical variable is statistically significant and our continuous variable for permit duration is no longer significant. This could indicate that the impact of permit duration on cancellation is skewed to those few projects that still had not received a ROD by the end of the CEQ study, and thus had very long permit durations.

Our categorical variable for whether or not the project is located in a restrictive state was also statistically significant, with a negative coefficient, for the regressions in which it was included. This indicates that projects in the restrictive states, when controlling for litigation, were actually less likely to be cancelled than projects located in other states at the time this study was completed. This is a somewhat counterintuitive result. The restrictive state designation that we used was based on the requirements of state environmental laws.¹⁴⁹ According to federal law, these state environmental laws do not apply, at least not directly, to federal projects.

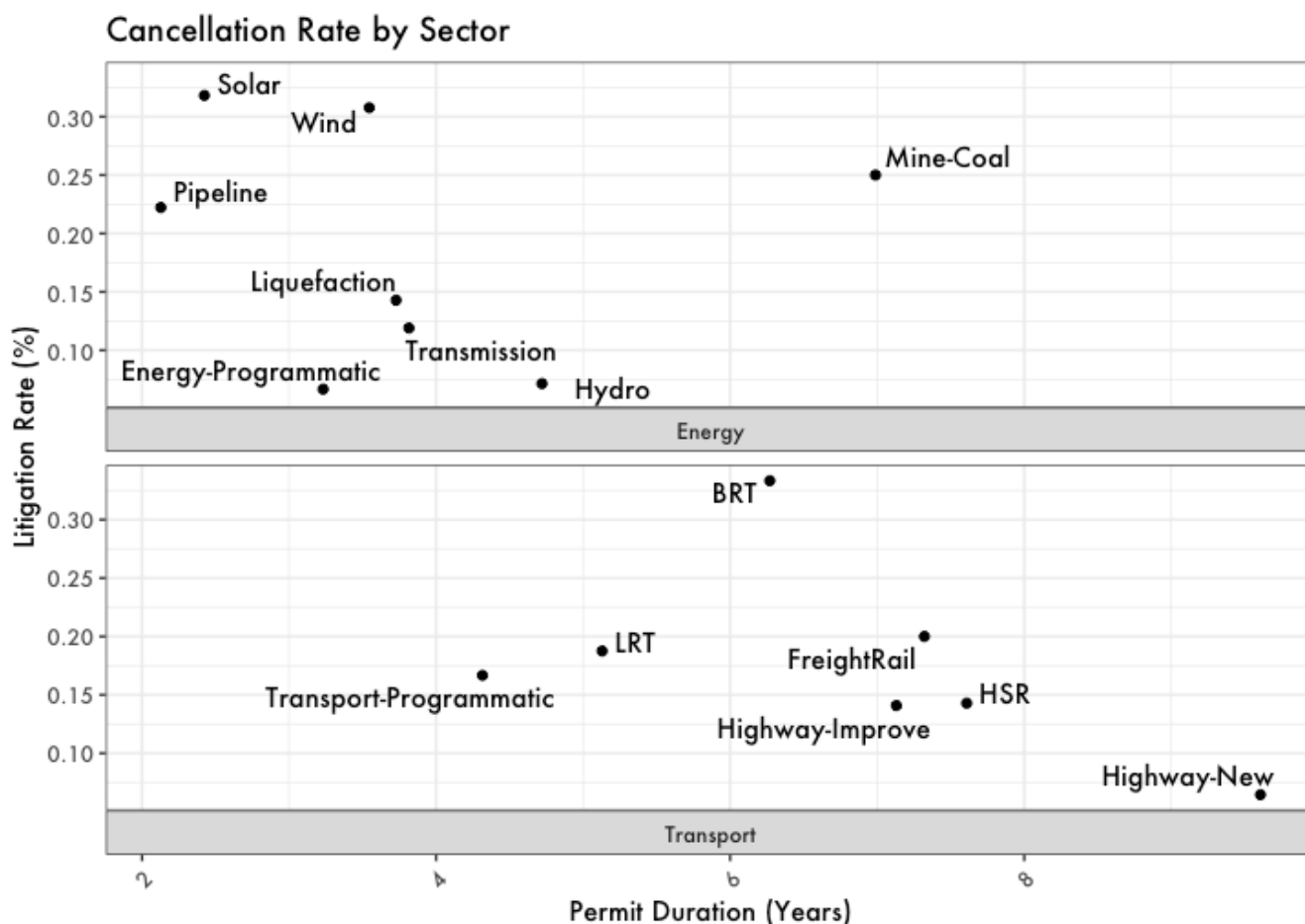
Therefore, a difference in cancellation rates between states based on state-level environmental laws would likely be indirect. It could be partially driven by variation in the sectors of projects permitted between restrictive and nonrestrictive states. Public sponsors in states with restrictive environmental laws may also be more likely to bring projects through the permitting process only if they anticipate very high levels of political support, due to the ease of stakeholder intervention in those states. This selection bias, if it exists, would likely lead to lower can-

147. All of the projects in our data set had completed a final EIS by the end of the CEQ study, but 28 of the projects had not yet completed a ROD. We included a categorical variable in our regression to capture these right-censored projects, in addition to our continuous variable for permit duration in years.

148. Appendix 1 and Appendix 2 are available at <https://www.elr.info/NEPA-litigation-infrastructure-appendix>.

149. See note 137 and accompanying text for the characteristics that determine the restrictive state environmental law designation.

Figure 5. Cancellation Rates and Permit Durations for Select Sectors



cellation rates for federal projects in states with restrictive environmental laws.

IV. Conclusions and Recommendations

Our objective in completing this study was to conduct a more detailed review of the causes and implications of litigation on large infrastructure projects in the United States, beyond what we observed in other empirical studies on this topic. We began with a CEQ-developed data set on permitting timelines and supplemented it with detailed project characteristics and litigation information. We are under no illusion that we have definitively quantified the costs and benefits of a system as complex as the NEPA process, but we do offer some novel contributions.

A. Litigation and the Environment

One of the obvious conclusions of our study is the varying rates of litigation between the sectors, and particularly for some sectors considered to be important to the energy transition and climate change mitigation. Within the energy sector, solar, wind, and transmission line projects exhibit high rates of litigation, even though these sectors are widely considered to be critical components of the energy transi-

tion away from fossil fuels. Similarly, in the transportation sector, some types of projects generally considered to be environmentally beneficial, such as LRT, exhibit worse permitting outcomes (in duration and litigation rates) relative to some other sectors considered to be less environmentally beneficial, such as highway improvements and expansions.

This is not as surprising as it first appears to be. The public comment-and-litigation process established by NEPA is naturally predisposed toward the local environmental and social impacts of projects, because those are the impacts that motivate stakeholders and interest groups to intervene in the permitting process. It is not a process that is capable of balancing the complex environmental trade offs of a utility-scale solar project.

Perhaps Professor Caldwell intended for it to be able to do just that, and federal agencies certainly attempt it via extensive environmental studies. However, that analysis is only applied in NEPA's *administrative* process. The key decisionmakers under NEPA's *judicial* process are the stakeholders that elect to litigate, for any of the various reasons that stakeholders oppose infrastructure projects, and the courts that decide their cases. That judicial review is further almost entirely procedural in nature.

Some critics of NEPA have argued that the process appears to prioritize local stakeholder and habitat impacts

over broader environmental concerns like climate change, but this is not entirely correct. NEPA's judicial process is limited to the question brought before the court by the plaintiff. The court must assess whether the plaintiff's environmental claims have been adequately studied, rather than weight those concerns against other environmental concerns.

B. *Litigation-Proofing and Risk*

One of our main findings is that projects in various sectors have very different processes for dealing with the uncertainty of the NEPA process and potential litigation. Major energy-sector projects tend to have shorter permitting times and higher rates of litigation, while the transportation public works sectors tend to exhibit lower litigation rates but extremely long permit times. We attribute some of this differential to varying rates of private investment in projects between the sectors.

Projects in sectors with higher rates of private investment have less litigation-proofing in response to a permitting conflict. This is driven by the extremely high risk associated with private investments in infrastructure projects before they have completed federal permitting. Private sponsors of infrastructure projects may be highly motivated to "resolve" the federal environmental study (one way or another) and thus willing to accept higher litigation risk.

We can generalize a bit and classify what we observe as two distinct but overlapping strategies for navigating federal environmental permitting: one that accepts a higher degree of litigation risk and thus has shorter permitting timelines but also higher rates of litigation, and another that has very long permitting timelines, perhaps due to litigation-proofing, and thus relatively lower rates of litigation. The question of which of these "strategies" is optimal would likely be determined by a wide range of unique circumstances of the environmental impacts, politics, and economics of a specific project.

However, we do note that in the sectors with higher rates of private investment in predevelopment, project sponsors appear to accept more permitting risk and to complete permits faster.

This divergence between energy and transportation projects broadly relates to the results of our review of the current status of the projects in our data set. Despite having completed a final EIS between 2010 and 2018, less than half of the projects in our data set were completed by the time this study was undertaken. While in some cases this may be due to very long construction timelines due to engineering considerations, it is clear that other factors are impacting post-EIS development timelines.

This aspect of the impact of NEPA's administrative and judicial processes is extremely difficult to measure or observe aside from detailed but anecdotal case studies. A lengthy and uncertain federal permitting process compounds across contracts, other regulations, budgets, and political changes. These interlinking deadlines can create a chain reaction in response to permit delays or uncertainty.

Minor delays can have massive impacts when, for instance, project champions term out of office, or if contract terms expire and need to be repriced, or if municipal budgets are reduced, or if commodity prices change, and so on. The NEPA process must be understood as just one critical component of a broader network of constraints on infrastructure development, some of which are an unavoidable requirement of project development in a liberal democracy and others of which are unique to the United States.

C. *Other Project Characteristics*

Our regressions on project characteristics in addition to the sector of the project produced some more nuanced results. We found that projects with a supplemental EIS were more likely to be litigated. That aligns with other anecdotal reports of "litigation proofing" as a driver of permit durations and page counts, and the potential relationship between expected litigation and the decision to complete a supplemental EIS. We also found that litigation is correlated with project cancellation even when sector is taken into account. Finally, we found that states with more restrictive *state-level* environmental laws were associated with lower rates of project cancellation for the *federal* projects included in our data set.

D. *Transparency*

Despite the importance of this research area, it was remarkably challenging to conduct empirical research on the topic of project litigation. Even with more recent efforts to standardize information, such as the Federal Permitting Dashboard, there is little standard information on permit timelines, issues, costs, and outcomes. There is far less easily accessible public information useful for an empirical study of project litigation.

The litigation databases that we used for this study are naturally oriented toward their users, or attorneys, and thus focused on published cases and legal precedent. Empirical research is much more challenging to conduct, especially in the many cases that do not result in a published opinion, or which are resolved via settlement. The result is a lack of transparency in many of the most important decisions regarding our public works and their mitigations, because many of those decisions are made during litigation settlement negotiations or during negotiations with stakeholders in the shadow of their threats of litigation.

It is in the public interest for transparency to be significantly increased in NEPA litigation and for other costs and litigation associated with the permitting of infrastructure projects. Recent legislative proposals have included transparency requirements addressing only minor, direct costs, such as the agency expenses to prepare an environmental study. A better alternative would be a requirement for federal agencies to publish online all documentation associated with project litigation during predevelopment, alongside the (already) publicly posted environmental study for the project. Given the public interest in project litigation, agencies should also be required to publicly disclose litigation

documents instead of leaving journalists and the public to contend with and pay for federal court records.

Additional transparency regarding project mitigations and their associated costs would also be in the public interest for major infrastructure projects, though complete transparency may be impractical in this area. Federal agencies should have wide latitude in determining necessary environmental and social mitigations for infrastructure projects. It is unreasonable to attempt to classify mitigations based on their source, such as negotiations with stakeholders and litigation settlement agreements. However, public disclosure of a consolidated list of all project mitigations and their associated costs could significantly improve transparency while still preserving flexibility for federal agencies during the permitting process.

E. Areas for Future Research

On the surface, one of the additional challenges of researching a law like NEPA is that the law is changing in response to case law, new legislation, and rulemakings. The impact of these changes takes time to materialize, and the results of any study of prior NEPA outcomes are overshadowed by any policy changes that have happened since. One of the conclusions of our study, however, is that many of the administrative changes are unlikely to have significant impacts on NEPA outcomes. Absent more substantial reforms, we believe that there will be many opportunities for additional empirical research on NEPA and U.S. infrastructure permitting writ large in the future.

One area of future research that we identified is project timelines after a final EIS or other environmental study is completed. Much of the research and policy discussions on the NEPA process have focused on very long permitting timelines, but our results indicate that some projects also spend an extremely long time in predevelopment and construction years after their final EIS is completed. Some of this is of course driven by engineering considerations, but we hypothesize that there are other factors, such as political changes, economic cycles, or local regulations, that also impact post-EIS development timelines. With a detailed review of project completion dates, other statistical methods such as duration analysis could be used to identify drivers of post-EIS project durations.

Another useful area of further research would be a detailed review of the results of NEPA litigation based on the contents of claims. Prior studies have assessed the results of NEPA litigation based on the types of plaintiffs or agency reports of the issues raised in litigation. A more direct study could attempt to categorize the types of claims made in NEPA litigation, along with the sector of the project, in order to determine if specific types of claims are correlated to various litigation outcomes.

Future research could also include a detailed review of the types of deficiencies claimed in NEPA litigation and where or whether those same issues were raised during the public consultation process. Such a study could help inform public agencies as to the types of impacts or project alternatives that are commonly raised during public con-

sultation and eventually remain points of conflict during litigation. That study would also inform agency strategies in structuring the public consultation process, because it would assess whether claims in NEPA litigation are commonly raised early in the permitting process or very late in the process, after a final study is published.

F. Concluding Remarks

Our most important conclusion is regarding what we were unable to discover. We aimed to contribute to the empirical research regarding the costs and benefits of NEPA on large transport and energy infrastructure projects. While we believe that we have made some contributions, this is perhaps an unachievable goal. The NEPA process can be understood, but all of its costs and benefits cannot be readily tabulated for policymakers to evaluate. This is because the vast majority of those costs and benefits cannot be found in the administrative processes of NEPA or the direct costs and benefits of the studies, but in the indirect costs and benefits that the NEPA process creates as it interacts with the many other constraints of infrastructure development in the United States.

If anything, and at the highest possible level, we conclude that current debates regarding the question of permitting reform are overly focused on NEPA's administrative process and comparatively neglect NEPA's judicial process. Judicial review of NEPA appears to significantly impact infrastructure project development in the United States, and it impacts both the projects that are litigated and those that are not.

We are happy to qualify this conclusion as limited to the large infrastructure projects that are the subject of this study, and the subsequent impacts of those projects on the American economy and people. Many thousands of other federal actions are also subject to NEPA, but have shorter permit times and lower rates of litigation.

We have refrained from discussing specific statutory reforms regarding the permitting process outside of those to improve transparency. As we noted in our introduction, statutory reform options for NEPA are a topic of considerable debate today. Most recently, some permitting reforms were included in the Fiscal Responsibility Act of 2023, and negotiations could produce additional legislation in the near future. However, most of the current reforms and reform proposals are adjustments to NEPA's administrative processes.¹⁵⁰ Few of the recent NEPA reforms or proposed statutory changes take up the question of the appropriate

150. Administrative reforms to NEPA in the Fiscal Responsibility Act of 2023 include page limits for environmental studies (42 U.S.C. §4337(e) (2023)), a requirement to study the negative environmental impacts of *not* implementing the proposed action (42 U.S.C. §4332(C)(iii) (2023)), several clarifications regarding the roles and responsibilities of a lead agency and cooperating agencies in a NEPA study (42 U.S.C. §4337(a) (2023)), the requirement that lead agencies establish a two-year deadline for an environmental study (42 U.S.C. §4337(g) (2023)), and a clarification that agencies may rely on the analysis in a programmatic EIS in future studies for up to five years after the programmatic study was completed, or afterwards so long as the agency reevaluates the analysis (42 U.S.C. §4338 (2023)), among others.

scope of judicial review of agency environmental studies under NEPA,¹⁵¹ which is the subject of our study.

Were there political support for reforms of NEPA's judicial process, then we would of course not recommend that judicial review of agency actions under NEPA be eliminated. We would, however, recommend statutory changes that delineate an unambiguous zone of agency discretion, using very clear language that federal agencies, stakeholders, and most importantly judges can understand. This would allow all parties to understand the requirements of

NEPA and the actions to which it applies. By clarifying the statute, such a reform could effectively narrow the space in which the court is required to, per *Calvert Cliffs*, "substitute its judgement for that of the agency."

Currently, however, NEPA's statute remains "silent as to judicial review," but NEPA's case law speaks volumes on the topic. It spoke to great effect shortly after NEPA became law, and it remains outspoken today. Regarding the future of NEPA, we presume that so long as the statute remains silent, the case law will continue to elaborate.

151. The Fiscal Responsibility Act of 2023 does include some statutory changes that will or may impact judicial review of NEPA studies. The most certain to impact judicial review is the provision to exempt the Mountain Valley Pipeline project from all judicial review under NEPA or any other environmental statute. More generally applicable statutory changes include several insertions to clarify that agencies must study "reasonably foreseeable" environmental impacts and to study "technically and economically feasible alternatives." See, e.g., 42 U.S.C. §4332(C) (2023). These changes could impact judicial review of NEPA if courts interpret this language as limiting the scope of environmental study, though the language remains unclear, and thus the impact will likely be marginal. The reforms also include a new private right-of-action for project sponsors to challenge lead agencies when an agency fails to meet a deadline for an environmental study. This may lead to an increase in NEPA-related litigation, though not of the kind included in our study.