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Quantifying the Opportunity of Reforming the Federal Communications Commission's National Environmental Policy Act and National Historical Preservation Act Rules

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Executive Summary

The National Environmental Policy Act (NEPA) requires federal agencies to consider the reasonably foreseeable environmental impacts of "major federal actions." The Federal Communications Commission (FCC) incorporated NEPA into its decision-making process by establishing procedures for reviewing such actions, which can include the deployment and modification of communications infrastructure, including towers and other macrocell locations, and small cell sites. With recent statutory and other changes applicable to NEPA, the FCC is considering revising its policies. In addition, the Commission is taking a look at its implementation procedures for the National Historical Preservation Act (NHPA). This related legislation requires that the FCC and other federal agencies consider the effects of federal "undertakings" on historic properties. However, there are no recent data on the costs that wireless providers face when complying with NEPA and NHPA. The objective of this study is to fill this gap and help the FCC to make informed policy decisions that simplify and accelerate the permitting of towers, small cells, and other wireless facilities, as envisioned in its August 14, 2025, Notice of Proposed Rulemaking (NPRM).

The study principally uses data and information obtained through surveys and working sessions with major mobile wireless providers. It finds that under the legacy regulatory NEPA and NHPA frameworks, mobile wireless providers would spend over $2.2 billion on regulatory compliance in the next decade alone. Additionally, complying with NEPA and NHPA regulations takes time, causing an estimated five-month delay in deploying new technologies and service upgrades. These rollout delays negatively affect jobs and economic growth, leading to a reduction in overall GDP, job losses, and significant decreases in consumer welfare, such as lower service quality and abandoned projects. The overall economic harm from the current policies amounts to at least $7.5 billion in welfare and economic activity loss over the next ten years. This amount includes the out-of-pocket expenses, the welfare loss associated with out-of-pocket expenses, and the welfare loss due to compliance delays. The welfare loss associated with the out-of-pocket expenses equals $4.0 billion and the welfare loss from the compliance delay amounts to $1.3 billion. Reform would promote faster and wider deployment of mobile wireless facilities to the direct benefit of the millions of US consumers.

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1 INTRODUCTION

On August 14, 2025, the Federal Communications Commission (FCC) released a Notice of Proposed Rulemaking (NPRM) that proposes streamlining the infrastructure permitting process required under the National Environmental Policy Act (NEPA).[1] Growing concerns that the current process has not kept pace with the rapid technological advancements in the telecommunications sector, changes in the legal landscape applicable to NEPA, and an updated interpretation of rules and precedent applicable to the National Historic Preservation Act (NHPA) prompted the FCC's effort to modernize and reexamine its NEPA and NHPA rules.[2]

The effects of the FCC's outdated environmental and historic preservation permitting process are especially noticeable in the deployment of wireless facilities. Growing demand for wireless capacity and faster, higher-quality signals has led to a continuing increase in deployment of various types of wireless facilities. However, the current permitting process adds unnecessary costs for wireless infrastructure and service providers and delays the deployment of higher-capacity networks and innovative services in the United States.

Despite numerous examples illustrating the negative effects of an outdated environmental and historic preservation review process, there is no recent data on the costs mobile wireless providers encounter when complying with NEPA and NHPA. The purpose of this study is to fill this gap, helping the FCC and other policymakers make informed decisions when revising regulations related to NEPA and NHPA.

The structure of this paper is as follows. Section 2 provides a contextual overview that explains the functions of various facilities in wireless networks and summarizes the NEPA and NHPA regulatory regimes as they apply to the wireless sector. Section 3 reviews the existing literature and other sources related to the quantification of the regulatory burden. Section 4 introduces the model that measures NEPA and NHPA deployment-related costs, explains the derivation of each input, and reports on the estimated service deployment delays. Section 5 presents the study's results and explores the public interest repercussions of the regulatory compliance burden. Section 6 concludes that modernizing the NEPA/NHPA regulations will reduce the cost and time inefficiencies resulting from the current regulations to promote faster infrastructure deployment, lower costs, and help deliver the full benefits of next-generation wireless services to consumers.

2 CONTEXTUAL OVERVIEW

NEPA ensures that federal agencies consider the reasonably foreseeable environmental effects of "major federal actions" (MFAs). NHPA requires federal agencies to consider the effects of federal

[1] See Federal Communication Commission, "Modernizing the Commission's National Environmental Policy Act Rules," *Federal Register* Vol. 90, no. 158 (August 19, 2025): 40295. (hereinafter FCC NEPA NPRM).

[2] Federal Communications Commission, "CTIA Petition for Rulemaking," Public Notice DA 25-290, March 31, 2025; 40 FCC Rcd 2239 (3) (hereinafter CTIA Petition). The recission of the Council on Environmental Quality NEPA regulations also contributed to the FCC's action. (See Council on Environmental Quality, "Removal of National Environmental Policy Act Implementing Regulations," Federal Register, Vol. 90 no. 30 (February 25, 2025): 10610.)

"undertakings" on historic properties. To comply with the two acts, the FCC implemented a permitting review process for communications deployments that it has previously found are MFAs under NEPA or undertakings for NHPA.

The ever-increasing demand for mobile capacity has led to continual increases in wireless facility deployments, meaning the legacy permitting process continues to impose costs. This section offers an overview of cellular towers, small cells, and other wireless facilities as part of the radio access network and explains the permitting process related to NEPA and NHPA.

2.1 Wireless Facilities

Mobile wireless services offer voice, internet data, and message services. Unlike fixed-line services, mobile wireless service is not stationary but portable, although fixed wireless access is rising rapidly. Subscribers to mobile wireless service connect to the network wirelessly over radio airwaves (spectrum) and can move freely within a network's coverage area without losing connectivity.

Mobile wireless handsets connect to antennas mounted on various types of infrastructure, such as specialized cell towers, buildings, telephone poles, and streetlights. These cell sites can support macrocells and small cells (microcell or picocell). 5G-based fixed wireless access services utilize the same infrastructure and spectrum as the mobile network, but the end-user device is an in-home router providing residential broadband connectivity.

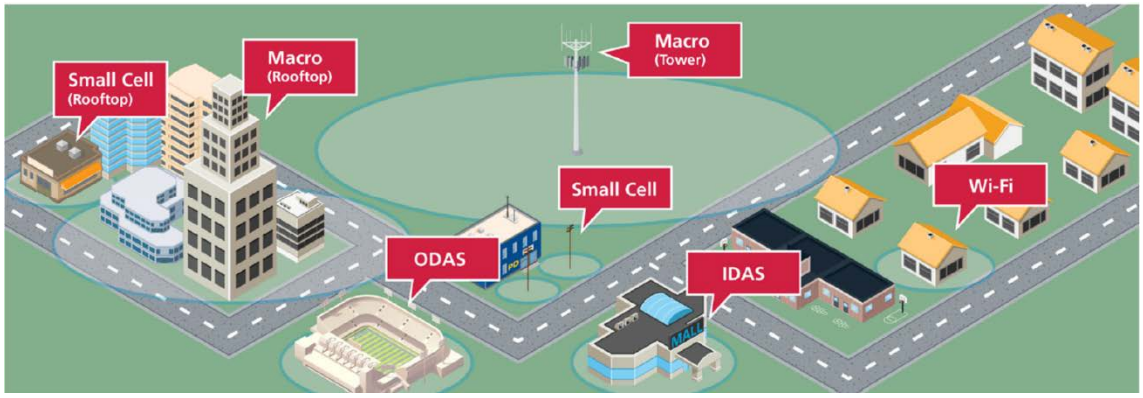
Macrocells are cell sites that contain multiple antennas and radios, allowing mobile network operators (MNOs) to provide service across different spectrum bands. Cell towers typically serve as support structures for macrocells, though wireless infrastructure is also deployed on other existing structures such as rooftops or water towers. These tall structures are equipped with multiple antennas and radios and are often seen along highways and in neighborhoods. Although towers mainly serve to support cellular networks, they can also host equipment for broadcasters, utilities, and government agencies. By the end of 2024, there were 172,000 cell towers and other macrocell locations in the United States.[3]

Small cells are cell sites consisting of low-power, short-range antennas installed indoors or outdoors near the end user. They complement microcell deployments, improve coverage in specific locations, address coverage gaps, and boost capacity in busy areas. Due to the limited coverage radius of this technology, mobile wireless providers attach these transmission facilities to streetlights, traffic signals, and other street furniture, which are often located within the municipal right-of-way (ROW). Each small cell usually includes multiple nodes, which are individual radio transceivers or antennas that serve as communication points within the microcell network. This paper focuses on outdoor wireless facilities, and disregards indoor small cells. By the end of 2024, there were 205,026 outdoor small cells in the United States.[4]

[3] S&P Global Market Intelligence, "North American tower projections through 2035," as of July 28, 2025.
[4] 479,760 small cell nodes converted to small cells using the WIA's reported average of 2.34 nodes per small cell. (S&P
Continued…

Figure 1 provides a visual depiction of the different types of installations and the infrastructure they are built on that make up a mobile wireless network. The key structures included for this study include towers and other macro cell locations as well as outdoor small cells.

Figure 1: Visual Representation of Mobile Wireless Network



Note: ODAS = outdoor distributed antenna system. IDAS = indoor distributed antenna system.
Source: American Tower, "U.S. Technology and 5G Update," as of December 31, 2024, p. 19.

2.2 NEPA-Related Wireless Permitting Regulation

NEPA, enacted in 1969 and amended in 2023, is a foundational environmental law in the United States. It requires federal agencies to determine whether any proposed MFAs will significantly affect the quality of the human environment and, if so, to assess the reasonably foreseeable environmental impacts of those MFAs.[5] An MFA is "an action that the agency . . . determines is subject to substantial Federal control and responsibility."[6]

Most wireless facilities providing wireless services to consumers are deployed pursuant to geographic area licenses. Geographic area licenses allow an MNO "to construct anywhere within a particular geographic area's boundary … and generally do not require applicants to submit additional applications for prior Commission approval of specific transmitter locations."[7] The FCC currently considers wireless infrastructure deployments in the context of a geographic area license to be MFAs.[8] So while wireless operators deploying networks using spectrum licensed on a geographic area basis do not need to acquire pre-construction or site-specific approval for facilities that do not require antenna structure registration, they still require NEPA permitting reviews under current regulations.

The Commission has determined that most of its licensing and approval activities do not individually or cumulatively have a significant impact on the environment, and are therefore

Global Market Intelligence, "North American tower projections through 2035," as of July 28, 2025; Wireless Infrastructure Association, "2024 Key Industry Statistics," Q2 2025, p. 8.)

[5] FCC NEPA NPRM, p. 40296.

[6] 42 U.S.C. § 4336e(10)(A).

[7] Federal Communications Commission, "Wireless Fees, Wireless Telecommunications Bureau Fee Filing Guide," updated May 23, 2025, https://www.fcc.gov/wireless-fees#:~.

[8] CTIA Petition, p. 9.

categorically excluded and generally do not require environmental reviews.[9] However, the FCC maintains a list of actions that may have a significant impact and, if one or more of these categories is triggered, the preparation, filing, and approval of an Environmental Assessment (EA) is required prior to construction.[10]

To comply with NEPA regulations, a licensee or applicant must first perform a NEPA assessment to determine whether a project may have a significant environmental impact, which would then trigger a more detailed environmental review. The checklist guides applicants through a series of questions about the project's potential impact on various environmental resources, such as wilderness areas, wildlife preserves, endangered species, and floodplains.

As Section 4.2.2 discusses, NEPA review costs are material costs in the construction of US mobile wireless networks. As such, they represent another important input to this study's cost calculation.

2.3 NHPA-Related Wireless Permitting Regulations

NHPA, enacted in 1966, requires federal agencies to evaluate the impact of federal undertakings on historic properties. Section 106 of the NHPA controls compliance.[11] A Section 106 review identifies historical properties that may be affected by a proposed undertaking and assesses whether the proposed action would have adverse effects on those properties. It also requires consultations with stakeholders to resolve any adverse effects through avoidance, minimization, or mitigation measures. Stakeholders include State Historic Preservation Officers (SHPOs), Tribal Historic Preservation Officers (THPO), federally recognized Tribes, the Advisory Council on Historic Preservation (ACHP), and the public. As the NPRM indicates, the FCC currently considers wireless infrastructure deployments in the context of a geographic area license to be undertakings.[12] The FCC's NHPA rules are entwined with its NEPA rules, and they incorporate nationwide programmatic agreements (NPAs) that guide the FCC's Section 106 review process and incorporate exclusions for certain deployments.[13]

As Section 4.2.3 discusses, Section 106 review costs are material costs in the construction of US mobile wireless networks. As such, they represent another important input to this study's cost calculation.

2.4 EA-Related Wireless Permitting Regulation

By completing the NEPA checklist (which includes an NHPA evaluation), applicants can assess the potential environmental and related consequences of their projects and determine whether further environmental review, such as an EA, is needed.

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[9] "Procedures Implementing the National Environmental Policy Act of 1969," 47 CFR Part 1 Subpart I (July 28, 2025), § 1.1306.

[10] See FCC NEPA NPRM, p. 40297

[11] See Advisory Council on Historic Preservation, "An Introduction to Section 106," accessed August 25, 2025, https://www.achp.gov/protecting-historic-properties/section-106-process/introduction-section-106.

[12] See FCC NEPA NPRM, p. 40297.

[13] See FCC NEPA NPRM, p. 40296; 47 CFR pt. 1, §§ 1.1307(a)(4) and 1.1320(a)(2)(ii).

An EA is an analysis used to determine whether a proposed action may have significant environmental or related effects. An applicant or licensee is required to submit an EA to the FCC for review and approval before beginning construction under the following circumstances:

- A proposed facility falls into any of the trigger categories.
- "[A]n interested person files a written petition alleging that a particular action, otherwise categorically excluded, will have a significant environmental effect and the responsible Bureau determines that the action may have a significant environmental impact."[14]
- "If the [FCC] determines on its own motion that a particular action, otherwise categorically excluded, may have a significant environmental impact."[15]

Once an EA is filed, "the document is put on public notice for 30 days, during which time the FCC ensures its sufficiency and takes public comments. If no issues are identified after any substantial comments are addressed, the FCC issues a FONSI (Finding of No Significant Effect)…."[16] If the FCC reviews a submitted EA and determines that the proposed action would have a significant environmental effect that cannot be mitigated or resolved, then an environmental impact assessment (EIS) would be required if the project is not abandoned.[17] The purpose of an EIS is to "describe[] the likely environmental impacts of that action, alternatives to taking the action (typically including 'no action'), and plans for soliciting feedback from the public."[18] The FCC to date has never issued an EIS under NEPA.[19]

As Section 4.2.4 discusses, EA costs are material costs in the construction of US mobile wireless networks. As such, they represent another important input to this study's cost calculation.

2.5 The FCC's NPRM

Congress amended NEPA in the 2023 Fiscal Responsibility Act (FRA).[20] Additionally, Executive Order 14154, issued in January 2025, instructed "'all agencies [to] prioritize efficiency and certainty over any other objectives' in revising agency regulations implementing NEPA."[21] Relatedly, CTIA filed a petition asking the FCC to find that geographic area deployments that do not require antenna structure registration are neither MFAs under NEPA nor undertakings under

[14] See FCC NEPA NPRM, p. 40297.
[15] Ibid.
[16] FCC, "Tower and Antenna Siting," accessed July 29, 2025, https://www.fcc.gov/wireless/bureau-divisions/competition-infrastructure-policy-division/tower-and-antenna-siting.
[17] FCC NEPA NPRM, p. 40297.
[18] Brian Potter, "How NEPA Works," August 19, 2022, p. 10.
[19] The FCC has done one "programmatic Environmental Assessment. On March 13, 2012, the Wireless Telecommunications Bureau (WTB) released a Final Programmatic Environmental Assessment (PEA) that evaluates the potential environmental effects of the FCC's Antenna Structure Registration." (See "Questions and Answers on the FCC NEPA Process," Environmental Health Trust, accessed July 29, 2025, https://ehtrust.org/question-and-answers-on-the-fcc-nepa-process/.)
[20] Fiscal Responsibility Act of 2023, Pub. L. No. 118-5, § 321, 137 Stat. 12, 38-46 ("FRA") (codified at 42 U.S.C. §§ 4321-47).
[21] Executive Order 14154, "Unleashing American Energy," *Federal Register* Vol. 90 (January 29, 2025): 8353,

NHPA.[22] The FCC responded to these developments by issuing an NPRM on August 1, 2025,[23] seeking comment on the issues raised in CTIA's petition and other measures aimed at streamlining permitting reviews while maintaining environmental safeguards, reflecting a broader effort to modernize federal permitting for infrastructure deployment.

3 Existing Literature and Cost Studies

Despite ample examples illustrating the negative repercussions of the outdated environmental and historic preservation review processes, no comprehensive recent information exists as to the costs mobile wireless providers incur in complying with NEPA and NHPA. As the following sections explain, only limited data exist. Our literature review uncovered only a 2018 study conducted by the consultancy Accenture Strategy and other limited publicly available information.

The absence of comprehensive data and research underscores a critical gap in understanding the true cost and impact associated with the current NEPA/NHPA review processes. Addressing this gap is crucial for enabling informed decision-making and effective policy development. This paper, along with its accompanying survey, aims to inform policymakers about the cost and time inefficiencies resulting from the current regulations, thereby supporting the effort to modernize the NEPA/NHPA processes.

3.1 Limited Government Disclosed Data

The government disclosed data on NEPA- and NHPA-related costs are minimal and dated. In 2003, NEPA's Task Force Report to CEQ estimated that a "small" EA typically costs between $5,000 and $20,000 and a "large" EA costs between $50,000 and $200,000; however, "small" and "large" were not defined.[24] The availability of NEPA/NHPA cost data is limited because there is no central, publicly available repository from the federal government that releases comprehensive cost information for NEPA assessments or EAs across agencies.

3.2 2018 Accenture Strategy Cost Study

A March 2018 study by Accenture Strategy is helpful but dated. This study examined how NEPA and NHPA federal regulatory reviews influence the deployment of small cell infrastructure in the United States. The finding of this study was that required regulatory reviews often involve procedures that hinder rapid deployment, leading to higher expenses and slower rollout timelines.[25] This particular study used data from a survey of mobile wireless providers to estimate the then-current expenses associated with NEPA and NHPA compliance for small cell deployment and to assess potential implications based on future deployment projections.[26] It determined that

[22] CTIA petition, *supra* note 2.
[23] See FCC NEPA NPRM.
[24] See 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," October 16, 2018.
[25] See Accenture Strategy, "Impact of Federal Regulatory Reviews on Small Cell Deployment," March 12, 2018.
[26] Ibid, p. 2.

in 2017, 28 percent of deployed small cells required NEPA or NHPA reviews and that, when reviews were required, on average, 29 percent of the total cost per small cell deployment was related to NEPA and/or NHPA.[27] The study also found that NEPA and NHPA reviews imposed average additional costs of $9,730 per small cell reviewed, resulting in $36 million in NEPA and NHPA expenditures for the 3,700 small cells deployed in 2017. Using a nine-year deployment forecast, which accounted for expected increases in small cell deployment, the authors estimated that this would result in cumulative costs of $2.43 billion.[28]

4 Cost Model and Inputs Derivation

Wireless providers incur three types of costs to comply with current NEPA and NHPA permitting regulations: (1) out-of-pocket; (2) time delay; and (3) opportunity. Opportunity costs are costs mobile wireless providers incur when allocating resources (e.g., labor) to the complex and at times ambiguous NEPA and NHPA compliance processes instead of efforts that provide mobile wireless services to US consumers. Although this study recognizes the existence of opportunity costs, it does not attempt to quantify them. Using survey data from major CTIA member mobile wireless providers, the following sections estimate the out-of-pocket costs and time delays that wireless providers face under the existing NEPA and NHPA regulations.

4.1 Study Data

Survey responses from mobile wireless providers, supplemented by working sessions with survey respondents and publicly available data, provide the basis for the cost estimation. The survey instrument sought data on the cost and time burdens imposed by the existing NEPA- and NHPA-regulated permitting process.

4.2 Methodology for Out-of-Pocket Costs

NEPA- and NHPA-related costs fall into three categories: (1) NEPA assessment costs, (2) Section 106 costs, and (3) EA costs. All tower and other macrocell locations, and outdoor small cell installations require a NEPA assessment; however, only portions of them require a Section 106 and an EA assessment. Mathematically, the model takes the following form:

$$TCost = (Assessment_{NEPA}\ x\ Install\ x\ \%Assessment) + (S106_{NHPA}\ x\ Install\ x\ \%S106) + (EA_{NEPA\&NHPA}\ x\ Install\ x\ \%EA)$$

where:

- $TCost$ = Total costs causal to NEPA and NHPA
- $Assessment_{NEPA}$ = Assessment review costs for NEPA
- $Install$ = Incremental counts of tower and small cell installations

[27] Ibid, p. 3.
[28] Accenture Strategy used a 3 percent cost inflation assumption. (Ibid.)

- $\%Assessment$ = Percentage of installations requiring an Assessment for NEPA
- $S106_{NHPA}$ = Section 106 review costs for NHPA
- $\%S106$ = Percentage of installations requiring a Section 106 review for NHPA
- $EA_{NEPA\&NHPA}$ = Environmental assessment costs for NEPA&NHPA
- $\%EA$ = Percentage of installations requiring an environmental assessment for NEPA&NHPA

The following sections detail the derivation of each of the input variables.

4.2.1 Number of Incremental Installations

The study applies cell tower and small cell projections by S&P Global Market Intelligence (S&P). Table 1 reports S&P's most recent forecast for a period of 10 years and calculates the incremental tower and other macrocell locations, and outdoor small cell counts.

Table 1: S&P US Tower and Outdoor Small Cell Projections

Year	Towers	Towers Change	Outdoor Small Cells	Small Cells Change
2024	172,000	--	205,411	--
2025	173,720	1,720	215,682	10,271
2026	175,978	2,258	232,936	17,255
2027	179,146	3,168	260,889	27,952
2028	182,729	3,583	300,022	39,133
2029	188,211	5,482	357,026	57,004
2030	193,857	5,646	417,721	60,694
2031	197,734	3,877	484,556	66,835
2032	200,898	3,164	552,394	67,838
2033	203,510	2,612	607,633	55,239
2034	205,748	2,239	650,167	42,534
2035	208,011	2,263	689,177	39,010

Note: Counts are as of July 28, 2025. The tower count includes other macrocell locations. The small cell totals exclude small cell nodes applying an average of 2.34 nodes per small cell.
Source: S&P Global Market Intelligence, "North American tower projections through 2035," as of July 28, 2025.

Before inserting the tower and other macrocell locations, and small cell count into the cost model, small cell nodes, which are included in the S&P count, must be removed from the projections.[29]

4.2.2 Average NEPA Assessment Cost

The responses to the wireless provider survey indicate an average cost for a NEPA assessment of $2,374 per installation.[30] These costs are expected to increase annually due to inflation, with a 2.4 percent increase in 2026, a 2.1 percent increase in 2027, and a 2.0 percent increase from 2028 onward.[31] The wireless provider survey responses reveal that NEPA assessment costs can vary significantly, generally ranging from $100 to $5,500. All new installations—towers, other macrocells, and small cells not on previously existing infrastructure—require a NEPA assessment. Consequently, each new installation will incur a NEPA assessment fee.

4.2.3 Average NHPA Review Cost

The survey responses indicate that it costs an average of $2,883 per installation to prepare a Section 106 review in compliance with NHPA. These costs are expected to increase annually due to inflation, with a 2.4 percent increase in 2026, a 2.1 percent increase in 2027, and a 2.0 percent increase from 2028 onward.[32] The wireless provider survey responses reveal that Section 106 costs can vary significantly, generally ranging from $1,000 to $5,000. The survey responses indicate that roughly 6 percent of new outdoor small cell installations and 100 percent of new towers require a Section 106 review in compliance with NHPA.[33]

4.2.4 Average Environmental Assessment Cost

The survey responses indicate that it costs an average of $15,500 per installation to prepare an EA when required as a result of a NEPA assessment and/or NHPA review. These costs are expected to increase annually due to inflation, with a 2.4 percent increase in 2026, a 2.1 percent increase in 2027, and a 2.0 percent increase from 2028 onward.[34] The mobile wireless provider survey responses also reveal that EA costs can vary significantly, generally ranging from $5,000 to $50,000. These values are confirmed by information from other public releases. For example, in comments to the Commission, one provider stated that "EAs alone can be costly, ranging from $10,000 to $50,000."[35] Survey responses indicate that about 7 percent of new installations face EA

[29] The WIA reports an average of 2.34 nodes per small cell. This information enables estimating the annual number of small cell installations excluding nodes. To calculate this, we divide the small cells change each year by 2.34. (See Wireless Infrastructure Association, 2024 Key Industry Statistics, Q2 2025, p. 8.)

[30] The NEPA assessment includes completing the NEPA checklist.

[31] The Federal Reserve, "FOMC Projections materials, accessible version," June 18, 2025, https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20250618.htm.

[32] The Federal Reserve, "FOMC Projections materials, accessible version," June 18, 2025, https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20250618.htm.

[33] We note that even if a facility is excluded from Section 106 review, there are still costs involved in making an assessment to determine and document when an exclusion applies.

[34] The Federal Reserve, "FOMC Projections materials, accessible version," June 18, 2025, https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20250618.htm.

[35] Federal Communications Commission, "Petition for Rulemaking to Update Part 1, Subpart I of the Commission's Rules

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costs. This percentage and average costs reflect both installations that are completed and planned facilities that incurred EA-related costs but were not pursued, perhaps due to compliance costs and delays. Not all EA-impacted facilities result in an EA filed with the regulator.

5 Study Results and Consumer Effects

The wireless provider survey reveals that consumers suffer from the consequences of out-of-pocket costs, time delays, and additional challenges that the wireless providers incur to comply with the NEPA/NHPA regulatory burden. These compliance costs are ultimately passed onto consumers, whether in the form of higher prices, delayed deployment of new technologies, reduced service in underserved areas, slowed economic growth, and job loss.

5.1 Out-of-Pocket Costs

If the existing regulatory framework remains in place, wireless providers are projected to spend a total of $2.2 billion on NEPA/NHPA permitting over the next decade. Table 2 provides a summary of the industry's expected annual expenditure on wireless infrastructure deployment under the current NEPA/NHPA regulations.

Table 2: NEPA/NHPA Compliance Costs for Wireless Infrastructure Deployment

Year	NEPA Assessment Cost	NHPA Section 106 Cost	EA Cost	Total
	[1]	[2]	[3]	[4] = [1]+[2]+[3]
2025	$ 28,462,592	$ 6,736,140	$ 12,700,002	$ 47,898,734
2026	$ 47,430,398	$ 9,724,560	$ 21,163,432	$ 78,318,390
2027	$ 77,232,448	$ 14,604,681	$ 34,461,099	$ 126,298,229
2028	$ 108,131,853	$ 18,236,546	$ 48,248,406	$ 174,616,805
2029	$ 161,340,728	$ 27,919,922	$ 71,990,193	$ 261,250,843
2030	$ 174,719,615	$ 29,712,745	$ 77,959,849	$ 282,392,209
2031	$ 189,957,805	$ 25,736,373	$ 84,759,126	$ 300,453,304
2032	$ 194,549,212	$ 24,076,920	$ 86,807,811	$ 305,433,942
2033	$ 161,686,177	$ 20,118,048	$ 72,144,332	$ 253,948,557
2034	$ 127,637,208	$ 16,588,898	$ 56,951,691	$ 201,177,797
2035	$ 120,013,736	$ 16,260,785	$ 53,550,100	$ 189,824,621
Total	**$ 1,391,161,772**	**$ 209,715,618**	**$ 620,736,041**	**$ 2,221,613,431**

Source: NERA

Implementing the National Environmental Policy Act," Comments of T-Mobile USA, Inc., RM-12003, April 30, 2025, p. 6.

5.2 Time Delays

The survey responses indicate that it takes two weeks to four months to complete a NEPA assessment, two to six months to complete a Section 106 review, and 2½ to six months to complete an EA. The survey responses explain that the NEPA assessment and Section 106 review can be done simultaneously, taking about three to six months to complete when done together. Then, if required, the EA process can begin. On average, the combination of these time delays take roughly five months. However, some EAs alone have been reported to take up to 18 months, with outliers lasting up to five years. These values are confirmed by other public releases. One provider indicated that the EAs on its 5G macro sites take an average of three to six months to prepare, but outliers can extend the period as a "pending site has been delayed for more than six months … because of a disagreement regarding the local notice process."[36]

5.3 Additional Regulatory Burdens

The most frequently reported additional challenges that wireless providers encounter under the current regulatory framework include a range of issues that contribute to increased complexity and project delays. These challenges include inconsistent requirements, particularly for sites located on federal land. Varying interpretations of regulations by federal, state, and local agencies also complicate the process because each jurisdiction may apply different standards or procedures. The diversity of state-specific submission requirements for SHPO reviews, coupled with delays in obtaining SHPO approval, interferes with deployment timelines. The lack of standardized submission methods, such as the shift between hard copy and online submissions, also contributes to inefficiencies and delays. Further, varying tribal consultation processes and responsiveness add another layer of complexity and delay, underscoring the need for more streamlined and consistent regulatory procedures across all levels of government and stakeholder groups.

5.4 Welfare Losses

The consumer effects of the current NEPA and NHPA requirements are at least four-fold. Some of these effects can be quantified.

First, the outdated requirements exert upward pressure on retail prices and downward pressure on plan features. With all facilities-based mobile wireless providers facing these costs, they will pass them, at least in part, through to the retail market.

Second, the outdated requirements deter mobile wireless network investments, especially rural and remote regions, where compliance burdens might render deployment uneconomical.[37] As the FCC recognizes, the investment effect is particularly harmful to US consumers. The agency finds that "an FCC-created compliance requirement … could pose barriers to infrastructure

[36] Federal Communications Commission, "Petition for Rulemaking to Update Part 1, Subpart I of the Commission's Rules Implementing the National Environmental Policy Act," Comments of T-Mobile USA, Inc., RM-12003, April 30, 2025, p. 6.
[37] CTIA NEPA Petition, p. 21.

investment."[38] This deterrence in investment and the slower rollout of new technologies will "have negative effects on job and economic growth, and [will] risk leaving many behind in today's technology revolution."[39]

Third, the outdated requirements delay service deployments in rural and underserved areas and roll-out of advanced mobile wireless networks (e.g., standalone 5G networks). The existing literature provides some indication of the consumer effect of these delays. A 2019 study finds that the effect on the US GDP of a six-month delay in 5G deployment will be approximately $104 billion.[40] Using industry-specific investment multipliers developed by the US Bureau of Labor Statistics, which are only available on an annual basis, the study estimates that a one-year delay in investment in infrastructure would reduce US employment by 25.2 thousand jobs.[41] A 2023 study focusing on the delay of deploying mid-band 5G spectrum necessary to provide related services to US consumers found that a 6-month service delay to approximately 77 million subscribers would cause consumer welfare harm of approximately $1.3 billion.[42] The same study estimated the job losses resulting from the reduced capex spending at about 17,000 jobs.[43]

Although the precise consumer effects of the outdated NEPA and NHPA requirements are outside the scope of this study, the existing literature clearly demonstrates that effects are significant and far reaching. They likely underestimate the negative consumer effects because they do not capture the impact of new developments such as the deployment of fixed wireless access (FWA). The deployment of FWA has provided additional broadband options to millions of households.

In addition to carrying the effects of the $2.2 billion in out-of-pocket expenses, US consumers face roughly another $1.3 billion in welfare destruction based on the 2023 study because of the time it takes to comply with the requirements, with these effects aggregating to at least $3.5 billion over the period.

Fourth, diverting infrastructure investment funds toward compliance-related expenditures results in an inefficient allocation of resources. This inefficiency can be measured using multiplier analysis, which explains how an initial injection of spending into the economy sets off a ripple effect of additional economic activity. Specifically, a multiplier indicates the total increase in economic output generated for every dollar spent initially. For example, a multiplier of 2.25 implies that a $1 increase in an industry's output ultimately results in a $2.25 increase in the overall economy's output. Diverting the estimated $2.2 billion in out-of-pocket costs from the construction of

[38] Federal Communications Commission, "Accelerating Wireless Broadband Deployment by Removing Barriers of Infrastructure Investment," WT Docket No. 17-79; FCC 18-30, Adopted: March 22, 2018, Released: March 30, 2018, Appendix C, ¶ 2.
[39] Ibid.
[40] See Debra J. Aron (Charles River Associates), "The Impact on the U.S. Economy of Excluding Huawei from Participation in the U.S. Market for Wireless Network Equipment," October 7, 2019, ¶¶ 20, 186. The study accounts for the delay in the US allocation of mid-band spectrum and estimates an about 5-year catchup period. (Ibid, ¶¶ 166–168.)
[41] Ibid, ¶ 20. The study measures the impact on direct, indirect and induced jobs. (Ibid, ¶ 188.)
[42] Coleman Bazelon and Paroma Sanyal, "Economic Impact of Delaying the Deployment of Auction 108 2.5 GHz Licenses," The Brattle Group, June 22, 2023, ¶ 24, Table 2.
[43] Ibid, ¶ 31. The study measures the impact on direct, indirect and induced jobs.

wireless infrastructure to NEPA and NHPA compliance leads to an approximate $4.0 billion reduction in total economic output in the communication infrastructure industry.[44]

The overall economic harm amounts to at least $7.5 billion over the next ten years, which includes $2.2 billion in out-of-pocket expenses, approximately $1.3 billion in consumer welfare losses due to compliance delays, and about $4.0 billion in lost economic output.

These costs represent a blended average and do not attempt to account for the unique costs born in rural areas or areas that have limited construction seasons or when accelerated construction is called for (such as after a natural disaster). Some areas may face disproportionate impact from NEPA- and NHPA-related costs.

6 CONCLUSION

This study highlights the considerable cost and time inefficiencies posed by the current NEPA/NHPA permitting process. It finds that under the legacy regulatory NEPA and NHPA frameworks, mobile wireless providers would spend in excess of $2.2 billion on regulatory compliance over the next decade alone. Additionally, complying with current NEPA and NHPA regulations results in an estimated average 5-month delay for deployment of new infrastructure and service upgrades that require NEPA/NHPA reviews. In addition to carrying the effects of the $2.2 billion in out-of-pocket expenses, existing literature finds that US consumers face roughly another $1.3 billion in welfare destruction because of compliance delays, and roughly $4.0 billion in lost economic output with the overall economic harm amounting to at least $7.5 billion over the period.

The out-of-pocket costs and time delays associated with NEPA assessments, EAs, and NHPA Section 106 reviews not only place a significant financial burden on wireless providers but also slow the rollout of advanced wireless networks. These rollout delays negatively impact jobs and economic growth, resulting in a reduction in overall GDP, job losses, and significant decreases in consumer welfare, such as reduced service quality and abandoned projects. As the industry anticipates continued expansion of installation deployments, it is increasingly imperative to streamline the infrastructure permitting process. Modernizing the NEPA/NHPA regulations will reduce the cost and time inefficiencies resulting from the current regulations to promote faster infrastructure deployment, lower costs, and help deliver the full benefits of next-generation wireless services to all Americans.

[44] Output multipliers were obtained through the U.S. Bureau of Economic Analysis.

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