

Lawrence Berkeley National Laboratory

LBL Publications

Title

Permitting and siting of wind and solar in Massachusetts: processes, timelines, and outcomes

Permalink

<https://escholarship.org/uc/item/7902g77h>

Journal

Frontiers in Sustainable Energy Policy, 5

ISSN

2813-4982

Authors

Baillargeon, Natalie

Katz, Juniper

Tao, Lanbing

et al.

Publication Date

2026-04-08

DOI

10.3389/fsuep.2026.1771870

Copyright Information

This work is made available under the terms of a Creative Commons Attribution-NonCommercial-NoDerivatives License, available at

<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Peer reviewed



OPEN ACCESS

EDITED BY

Noah Kittner,
University of North Carolina at Chapel
Hill, United States

REVIEWED BY

Heerae Lee,
University of North Carolina at Chapel
Hill, United States
Dan Virah-Sawmy,
Australian National University, Australia

*CORRESPONDENCE

Natalie Baillargeon
✉ nbailargeon@lbl.gov

RECEIVED 19 December 2025

REVISED 09 March 2026

ACCEPTED 16 March 2026

PUBLISHED 09 April 2026

CITATION

Baillargeon N, Katz J, Tao L, Nilson R and
Hoen B (2026) Permitting and siting of
wind and solar in Massachusetts:
processes, timelines, and outcomes.
Front. Sustain. Energy Policy 5:1771870.
doi: 10.3389/fsuep.2026.1771870

COPYRIGHT

© 2026 Baillargeon, Katz, Tao, Nilson
and Hoen. This is an open-access article
distributed under the terms of the
[Creative Commons Attribution License](#)
(CC BY). The use, distribution or
reproduction in other forums is
permitted, provided the original author(s)
and the copyright owner(s) are credited
and that the original publication in this
journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

Permitting and siting of wind and solar in Massachusetts: processes, timelines, and outcomes

Natalie Baillargeon^{1,2*}, Juniper Katz¹, Lanbing Tao^{2,3},
Robi Nilson² and Ben Hoen²

¹School of Public Policy, University of Massachusetts Amherst, Amherst, MA, United States, ²Berkeley Lab (DOE), Berkeley, CA, United States, ³Bren School of Environmental Science and Management, University of California, Santa Barbara, Santa Barbara, CA, United States

Permitting reform, shaped by local and state governance, could eliminate unnecessary administrative burdens that slow the development of new electricity generation. However, the permitting process or duration is not well known, especially for locally-permitted projects, which are the standard in the U.S. Northeast and the most common permitting type in the United States. Here, we create an original data set of locally-permitted wind and solar energy projects in Massachusetts to document those timelines. We find that, on average, the permitting duration lasted 250 days, and this duration has increased over time. Permitted and lower capacity projects were associated with shorter permitting duration while canceled and larger capacity projects are associated with longer permitting duration. The results represent the first attempt to calculate permitting speed for locally-permitted wind and solar energy projects at a time when several states are reforming permitting policies, including Massachusetts. This study, therefore, contributes to both the academic and policy debates about how to balance fast deployment with fair practices that weigh the concerns of local communities.

KEYWORDS

energy policy (US), land use, local governance, Massachusetts, permitting and siting

Introduction

The speed and scale of developing new energy supply is heavily dependent on state and local leadership (Katz and Baillargeon, 2025). One key barrier that stakeholders grapple with is often uncertain permitting processes, timelines, and outcomes (Hess and Ruhl, 2025). They are cited by developers as a leading cause of delays and cancellations (Nilson et al., 2024). Permitting refers to the rules and procedures needed to obtain permission to site and build energy facilities, often influencing outcomes related to project design and location (O'Shaughnessy et al., 2025). Permitting authority for solar and onshore wind is primarily under state or local jurisdiction in the U.S. (Enterline et al., 2024; Mai et al., 2025). Massachusetts' permitting framework, the focus of this study, offers an important window into implementation that other states may learn from. Here, we conduct a first-of-its-kind permitting timelines analysis for locally-permitted wind and solar energy projects in Massachusetts, investigating how these timelines differ among key sample cohorts.

Land use authority is a state function delegated to counties and municipalities via zoning and enabling acts under home-rule or Dillon's Rule frameworks.¹ This structure reflects Constitutional principles wherein powers not granted to the federal government are reserved to the states under the Tenth Amendment and retained or delegated. The entity that holds the principal decision-making power over the permitting processes is the primary authority having jurisdiction (AHJ). The structure of state and local jurisdictions varies both across states and within states (Enterline et al., 2024). Some degree of local-based jurisdiction over permitting is most common, often shared with state-based jurisdiction, where both levels of government hold some authority or the AHJ is contingent on project characteristics, such as capacity (Enterline et al., 2024). Therefore, in many cases, variation in permitting processes and rules do not occur just across states but across counties and municipalities.

The AHJ in Massachusetts is contingent on project size (i.e., installed capacity exceeding 100 MW (or 25 MW after March 2026) falls under state jurisdiction); to date, no project has been large enough to preempt local authority. Localities exist within the state's legal frameworks; however, there is limited state guidance and oversight when the AHJ is local. The primary state laws applicable to local processes relates to public hearing transparency and meeting structure (Mass. Gen. Laws ch. 40A, § 9), or authority limitations due to court rulings (Heuer et al., 2025). As such, processes and rules vary widely across the 351 Massachusetts cities and towns.

However, Massachusetts is among a wave of states rethinking permitting as pressure mounts to meet clean energy² targets, improve public participation, and respond to concerns over rising electricity costs. Massachusetts enacted Chapter 239 of the Acts of 2024 in November 2024, which, among other changes, directed several permitting changes (2024 Mass. Acts ch., 239). The new law, among other provisions, directs agencies to establish a standard, consolidate local permitting processes, establish binding timelines for local permitting decisions, elevate community engagement efforts, and provide greater technical support to local governments (Gerson, 2024). Notably, Massachusetts maintains town-based AHJ for most energy projects, despite growing anecdotal evidence that local AHJ slows permitting speeds due to fewer resources to complete project reviews and more opportunities for local project vetoes (Hess et al., 2025; Nilson et al., 2024). This anecdotal evidence would benefit from systematic analysis of permitting timelines in the Commonwealth; a gap this study seeks to fill.

This research adds value in several ways. The impacts of the new Massachusetts permitting law will remain unclear until promulgation but understanding the current state of permitting in the Commonwealth provides an essential baseline understanding

to compare and evaluate future timelines. Furthermore, the Commonwealth's experience can inform other states' permitting reform. Finally, this study represents the first systematic dataset of local-level timelines and outcomes, which provides an opportunity for comparisons between local- vs. state-based AHJ in this and other states.

Methodology

Data

The primary aim of the research is to establish the time between permit application and application decision for projects in our sample. We developed a schema for categorizing key stages in the permitting process. Our focus was projects that entered the permitting process in or after 2018, though, we also include any earlier projects' data (including projects with a submission year as early as 2009) when they were present in any AHJ we were already collecting data from. Data was difficult to collect, so when encountered, we gathered data, even outside of the target period.

To create the project sample, we used U.S. Energy Information Administration (EIA)'s Preliminary Monthly Electric Generator Inventory (data derived from Form EIA-860M) (U.S. EIA, 2025) and the U.S. Large Scale Photovoltaic Database (USPVDB) (Fujita et al., 2023). However, these sources do not include all projects that entered a permitting process. There is no single database, including EIA, that tracks all projects, across AHJs, that sought permitting. This remains an ongoing challenge for energy researchers in establishing what the true population of projects is in a given state or locality.

The sampling strategy was purposive. We sought diversity across the following dimensions: project status (e.g., permitted and canceled), town size, geography, county representation, and project density. We searched for evidence of permitting timeline and process in 41 towns, representing approximately 21% of Massachusetts towns that were identified as having at least one project in EIA data.

Data availability was a major challenge because Massachusetts does not have a single permitting portal (this has since changed and will be implemented in 2026). As such, most locations have no database or public-facing source of information related to permitting for wind and solar. We were only able to collect data from 25 towns. Each search was exhaustive and ended when no additional data could be found.

The data collection effort sought the date of discrete steps in the permitting process. Steps included application submission to AHJ (the "start date"), public hearing dates, and special permit decisions ("end date") used to calculate permitting duration. While our full sample includes 42 energy projects in 25 Massachusetts towns for which one or more date points were gathered, we were only able to collect both application submission and application decision dates for 26 of the 42 projects, in 17 towns. Thus, we can only calculate permitting timelines for this subset.

Data was collected from publicly available documents, including meeting minutes, site plans, permit applications, and media coverage. Often, permitting timelines and outcomes are pieced together across several resources. For instance, we might

¹ Home-rule states are those in which local governments operate with a degree of autonomy granted by the state constitution, whereas Dillon's Rule states are those in which local governments possess only the authority expressly delegated to them by the state government (Aldag et al., 2018; Fowler and Witt, 2019).

² Massachusetts defines "clean energy" as "advanced and applied technologies that significantly reduce or eliminate the use of energy from non-renewable sources..." (Mass. Gen. Laws ch. 23J, § 1).

find a permit application on a town website that includes the date of submission but need a transcript of a town meeting to find the date the project was permitted (or denied). Collected documents were saved and organized by type. When public information was not available, researchers contacted local officials directly via phone and email. Direct contact frequently resulted in no response, or alternatively, the data we sought could not be located, due to, as we witnessed, non-standard processes for data retention in these small, local government settings.

Analytical approach

We conducted descriptive and statistical tests on the subset of data for which we have permit timelines to examine the relationship between permitting duration and three explanatory variables: decision year, permit status, and installed capacity. We organize decision year into three categories (2009–2014, 2015–2019, and 2020–2025), creating approximately equal length year categories. We organize permit status into three categories, permitted, lawsuit, and canceled. “Permitted” includes any projects that received a permit approval, including operating, under construction, or projects awaiting construction. “Lawsuit” includes projects that are undergoing active lawsuits. Most “lawsuit” projects are in court to challenge the permitting decision (approved), and the challenges are oriented around land use concerns, such as environmental and viewshed impacts. While lawsuits are not a part of the formal permitting process, court decisions have informed permitting law and outcomes, such as terminating or canceling the project, in Massachusetts (Heuer et al., 2025; Merzbach, 2025b; Saint-Val, 2025). Finally, “canceled” projects represent projects that have been denied, withdrawn, or terminated. Installed capacity is similarly organized into three groups based on project installed capacity (MW): ≤ 2 , $> 2 - < 5$, and ≥ 5 . These groupings balance sample size, while respecting Massachusetts median wind and solar project size of 2 MW (U.S. EIA, 2025).

Permitting duration was non-normally distributed, and sample sizes were small within factor levels. As a result, we employed the non-parametric Kruskal–Wallis test [referred to below as “H(2)”]. When Kruskal–Wallis tests were significant, we conducted *post-hoc* pairwise comparisons using pairwise Wilcoxon rank-sum tests with Benjamini–Hochberg correction applied within each factor (referred to below as “FDR”). All statistical modeling was completed in R Statistical Software (v4.4.1, Vienna; R Core Team, 2024)/RStudio (v4.2, Posit Team, 2024).

Results

The subsample, described in Table 1, includes 26 renewable energy projects that entered the permitting process between 2009 and 2023 with the majority (77%) entering after 2017. Most projects are solar or solar+storage (88%). Projects are in 17 towns (across six counties). Project capacities were mostly ≤ 2 MW (46%), but $> 2 - < 5$ (27%) and ≥ 5 (27%) were well-represented.

In total, we utilized 131 documents to derive variables. On average, five different documents were used per project. The most

common documents were letters, meeting minutes, and site plans (Supplementary Figure S1). Most letters were from developers, responding to comments or asking for extensions, or project abutters, providing feedback. All reviewed abutters’ letters called either for permit denial or raised concerns about the project.³ Concerns included contamination of drinking water, disturbing groundwater runoff, and environmental impacts of deforestation.

We find a mean permitting duration of 250 days and a median of 173 days, but this varies among several characteristics. Figure 1 reports permitting duration by decision year categories, showing it increases over time in the sample. We find the same trend for submission year categories (not shown). Median ranks of permitting duration differed significantly among the three decision year groups [$H(2) = 11.2$, $p = 0.00377$] with a large effect size [$\eta^2 = 0.24$, 95% CI (0.05, 0.42)]. Projects that entered the process between 2020 and 2025 were significantly longer in duration than those from 2009 to 2014 (FPR $p = 0.002$). Other pairwise comparisons were not significant. The most recent decision year category contains the greatest variation in permit status; yet, when restricting the sample to permitted projects only, projects from 2020 to 2025 remain significantly longer in duration compared to 2009–2024 (FPR $p = 0.048$).

We also assess the permitting duration by permit status (Figure 2). Permitted projects have the shortest permitting duration while canceled projects or those under lawsuit have longer timelines. A Levene’s test found heterogeneity of variance; therefore, these results are not suitable for a Kruskal–Wallis testing statistical significance.

Finally, we compare permitting duration by MW capacity groups (Figure 3). The group’s duration does not differ significantly [$H(2) = 3.46$, $p = 0.177$]. Further, delineating capacity groups by technology type resulted in too-small in-group sample sizes, but these results are shown in Supplementary Figure S2.

Discussion and conclusion

This first-of-a-kind-study systematically gathered data on permitting timelines and outcomes for 26 projects in Massachusetts permitted at the local level. Our data are not only relevant to Massachusetts but inform ongoing policy debates occurring across at least 47 state governments, grappling with permitting reform (Breckel and Falkenburg, 2025). Such debates are operating against the backdrop of limited empirical data. For Massachusetts, these data provide a baseline to understand the current state of permitting ahead of reforms that will begin in 2026.

The key finding in our sample is that permitting duration averaged 250 days, with a median of 173. The new Massachusetts legislation requires a decision within a year of project application, well outside our averages. In fact, most projects in our sample (81%) fall under the threshold.

Though, more recent projects taking longer might be a harbinger of ever-growing future delays. There is some evidence

³ Others have similarly found that those opposed to the project are overwhelmingly more likely to take actions such as writing letters (Firestone et al., 2018).

TABLE 1 Descriptive statistics for projects and associated variables ($N = 26$).

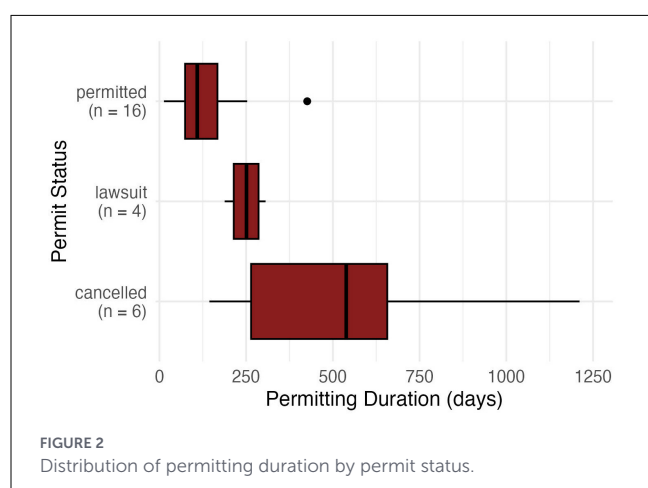
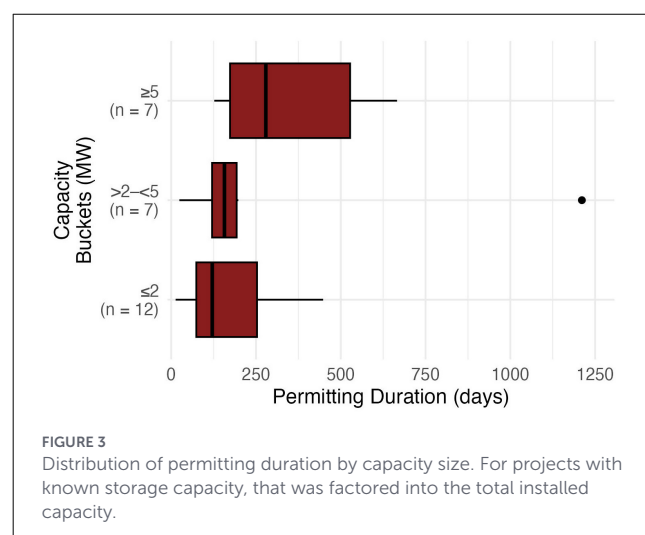
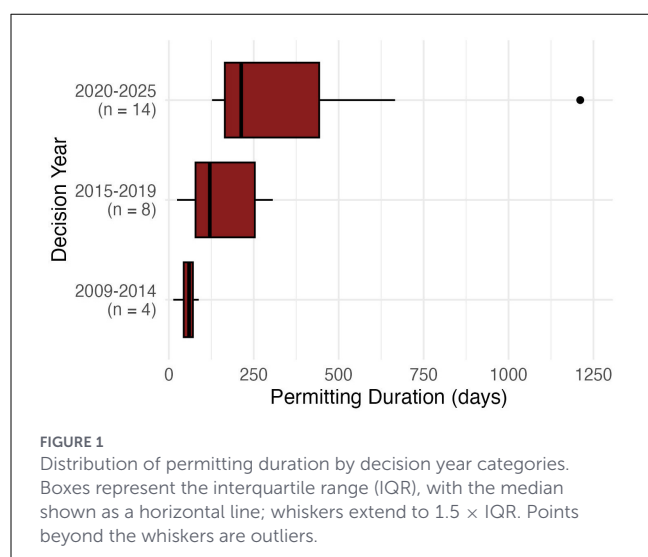
Project ID	Town	Technology type	Capacity size (MW)	Permit status	Decision year
66002003	Westport	Solar	≥ 5	Permitted	2022
66002004	Fitchburg	Solar	≤ 2	Permitted	2023
66002005	Westborough	Solar	≤ 2	Permitted	2013
66002006	Williamsburg	Solar	$> 2 - < 5$	Permitted	2019
66002009	Wareham	Solar	≤ 2	Canceled	2024
66002010	Uxbridge	Solar	≤ 2	Permitted	2015
66002011	Uxbridge	Solar	≤ 2	Permitted	2014
66002012	Northfield	Solar	$> 2 - < 5$	Permitted	2021
66002014	Northfield	Solar	$> 2 - < 5$	Lawsuit	2021
66002016	Leicester	Solar	≤ 2	Permitted	2017
66002017	Southbridge	Solar	$> 2 - < 5$	Permitted	2019
66002020	Wareham	Solar+storage	≥ 5	Canceled	2020
66002024	Norton	Solar	≤ 2	Lawsuit	2019
66002025	Spencer	Solar	≤ 2	Permitted	2018
66002027	Wareham	Solar+storage	≥ 5	Canceled	2020
66002028	Wareham	Solar+storage	$> 2 - < 5$	Canceled	2025
66002033	Cambridge	Onshore wind	≤ 2	Permitted	2010
66002035	Wareham	Solar+storage	≥ 5	Lawsuit	2021
66002036	Amherst	Solar+storage	≥ 5	Canceled	2025
66002037	Holliston	Solar+storage	$> 2 - < 5$	Permitted	2021
66002038	Holliston	Solar+storage	≥ 5	Permitted	2020
66002039	Plymouth	Onshore wind	≤ 2	Permitted	2009
66002040	Lexington	Solar	≤ 2	Lawsuit	2023
66002043	Holliston	Storage	≥ 5	Canceled	2024
66002047	Northampton	Solar	$> 2 - < 5$	Permitted	2018
66002051	Spencer	Solar	≤ 2	Permitted	2018

for this. For example, Massachusetts is a densely populated state with several competing priorities for land-use, including housing and agriculture. The sites that already host energy projects might be considered low hanging fruit locations and, therefore, what remains might be less ideal. Longer durations in more recent years could be because recent proposals are in less desirable places, such as in forests, closer to abutters, or on agriculture land (Crawford et al., 2022; Richardson et al., 2022; Wear et al., 2025), any of which may complicate permitting. Concerns raised in Massachusetts (Manning, 2023), including for specific projects in our dataset, support this theory. Instead, this trend could be the result of a rising regional or national conflict around wind and solar projects, suggested by other research (Stokes et al., 2023; Nilson et al., 2024). Whichever is the case, future research could assess whether permitting durations are increasing over time, and in other states. Identifying such trends would have important implications for the design of ongoing state permitting reform efforts in Massachusetts and beyond.

Our results also highlight the role that local conflict may play in the permitting process. In our sample, 10% of projects are under lawsuit over environmental or health concerns. We

also found evidence in news coverage and public comments of opposition for several canceled projects, which were also associated with longer timelines (Harrelson, 2025; Merzbach, 2025a,b). Considering the influence of opposition is particularly important for local-based AHJs, where a small fraction of opposition can heavily drive outcomes (Firestone et al., 2018; Siting Solutions Project, 2025). While our study does not attempt to establish causation for canceled projects, the results suggest opposition may be a factor and future research is needed to understand the relationships between opposition, timelines, and outcomes.

An additional insight gained in this process is that gathering permitting data at the local level is challenging. Many local governments do not make permitting information publicly available or even retain such information on file. For example, one local official told us they destroy records on canceled projects due to limited resources. Identifying an application submission date, or the beginning of the permitting duration, was particularly challenging. While decision dates are often captured in meeting minutes, towns often do not have a formal practice for preserving the application submission date or date of approval, in a systematic



way. In several cases, such records never existed or were no longer available. Notably, the lack of data availability is often less of a concern for state-based AHJ where states often maintain permitting portals with all records publicly available, such as in California (California Energy Commission, n.d.) or even in Massachusetts for large energy projects, like power plants and natural gas storage tanks (Energy Facilities Siting Board, n.d.). Another major challenge is there is no reliable way to identify the true population of projects that entered a permitting process, regardless of outcome. While we did our best to achieve a representative sample of the projects found in Massachusetts, the lack of accessible data in many towns may introduce selection bias in the data, potentially skewing our results toward projects with greater controversy or in towns with more accessible public information. Additionally, due to the complexity of the permitting process, we focused on the key permitting dates of application submission and decision. As a result, we cannot speak to what aspects of the permitting process that happen between these steps, which may alter the process duration. These data limitations present a challenge not only for this study, but for the research and policy community

writ-large in developing empirically driven policy insights about permitting reform.

Accordingly, public data transparency requirements related to recorded public decisions on energy projects would improve the standardization of information related to energy deployment and provide a foundation for tracking and understanding the permitting steps and duration. However, we recognize that local governments are often under-resourced making such a requirement onerous, if not impossible, to implement without funding and other types of capacity support. In the absence of such information, it will remain very challenging to evaluate the effects of current and future policy on wind and solar energy deployment at the local level. In Massachusetts, Chapter 239 of the Acts of 2024 mandates the creation of a clean energy dashboard for all clean energy projects, regardless of the AHJ (2024 Mass. Acts ch., 239). Such dashboards may address these data transparency concerns; however, it remains unclear the level of burden this new requirement will place on local governments and how Massachusetts will enforce the towns' use of the portal.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

NB: Data curation, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing, Validation. JK: Conceptualization, Funding acquisition, Methodology, Writing – review & editing, Investigation, Project administration, Supervision. LT: Conceptualization, Methodology, Writing – review & editing. RN: Conceptualization, Methodology, Visualization, Writing – review & editing, Project administration, Funding acquisition. BH: Conceptualization,

Methodology, Writing – review & editing, Project administration, Funding acquisition.

Funding

The author(s) declared that financial support was received for this work and/or its publication. This research was partially supported by the Elevating Equity Values in the Transition of the Energy System (ELEVATE), which is funded by the National Science Foundation NSF Research Traineeship (NRT) program (award no. 2021693), and by the U.S. Department of Energy (DE-EE0010143 and DE-AC02-05CH11231). It was also supported by the MA Department of Energy Resources.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

References

- 2024 Mass. Acts ch. 239.
- Aldag, A. M., Warner, M. E., and Kim, Y. (2018). Leviathan or public Steward? Evidence on local government taxing behavior from New York State. *Publius J. Fed.* 49, 671–693. doi: 10.1093/publius/pjy035
- Breckel, A., and Falkenburg, N. (2025). *The State of Siting: 2025 Legislative Round-Up. Clean Tomorrow*. Available online at: https://cleantomorrow.org/wp-content/uploads/2025/11/clean_tomorrow_2025-legislative-round-up-report_.pdf (Accessed September 24, 2025).
- California Energy Commission (n.d.). *California Energy Commission Power Plant Dockets*. California Energy Commission. Available online at: <https://www.energy.ca.gov/proceedings/dockets/california-energy-commission-power-plant-dockets> (Accessed December 18, 2025).
- Crawford, J., Bessette, D., and Mills, S. B. (2022). Rallying the anti-crowd: organized opposition, democratic deficit, and a potential social gap in large-scale solar energy. *Energy Res. Soc. Sci.* 90:102597. doi: 10.1016/j.erss.2022.102597
- Energy Facilities Siting Board (n.d.). *Energy Facilities Siting Board – Mass.gov*. Commonwealth of Massachusetts. Available online at: <https://www.mass.gov/orgs/energy-facilities-siting-board> (Accessed December 18, 2025).
- Enterline, S., Valainis, A., and Hoen, B. (2024). *Laws in Order: An Inventory of State Renewable Energy Siting Policies*. Clean Air Task Force, Lawrence Berkeley National Laboratory, Consensus Building Institute, Regulatory Assistance Project, Office of Energy Efficiency and Renewable Energy (DOE). Available online at: <https://emp.lbl.gov/publications/laws-order-inventory-state-renewable> (Accessed June 21, 2024).
- Firestone, J., Hoen, B., Rand, J., Elliott, D., Hübner, G., and Pohl, J. (2018). Reconsidering barriers to wind power projects: community engagement, developer transparency and place. *J. Environ. Policy Plann.* 20, 370–386. doi: 10.1080/1523908X.2017.1418656
- Fowler, L., and Witt, S. L. (2019). State preemption of local authority: explaining patterns of state adoption of preemption measures. *Publius J. Fed.* 49, 540–559. doi: 10.1093/publius/pjz011
- Fujita, K. S., Ancona, Z. H., Kramer, L. A., Straka, M., Gautreau, T. E., Garrity, C. P., et al. (2023). *United States Large-Scale Solar Photovoltaic Database (v3.0, April, 2025)*. U.S. Geological Survey and Lawrence Berkeley National Laboratory Data Release. Available online at: <https://doi.org/10.5066/P9IA3TUS>
- Gerson, Z. (2024). *Massachusetts Permitting and Siting Reform Is On The Way! What Does That Mean For Your Projects? Foley Hoag and RENEW Northeast*. Available online at: <https://foleyhoag.com/getmedia/005c1e59-73f2-44b8-af3e-6eff887bb9cd/Foley-Hoag-and-RENEW-NE-Webinar-Slides.pdf> (Accessed November 5, 2025).
- Harrelson, K. (2025). *Wareham Proposed Re-Zoning of Large Ground-Mounted Solar: What You Need to Know*. Community Land and Water Coalition. Available online at: <https://communitylandandwater.org/wareham-january-2025-proposed-re-zoning-of-large-ground-mounted-solar-what-you-need-to-know/> (Accessed December 2, 2025).
- Hess, D. J., and Ruhl, J. B. (2025). How can policy balance the goals of transition acceleration and justice? Permitting reform, large-scale renewable energy, and host communities in the United States. *Energy Res. Soc. Sci.* 129:104397. doi: 10.1016/j.erss.2025.104397

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Author disclaimer

The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, the Regents of the University of California, or the University of Massachusetts Board of Trustees. The U.S. Government retains and the publisher, by accepting the article for publication, acknowledges that the U.S. Government retains a nonexclusive, paid-up, irrevocable, worldwide license to publish or reproduce the published form of this work, or allow others to do so, for U.S. Government purposes.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsuep.2026.1771870/full#supplementary-material>

SUPPLEMENTARY FIGURE S1

Document count by type.

SUPPLEMENTARY FIGURE S2

Distribution of permitting duration by capacity size and technology type.

- Hess, D. J., Seo, H., and Belletto, K. (2025). Strengthening local siting authority for utility-scale solar: effects on regulatory decisions and public opposition. *Clim. Change* 178:38. doi: 10.1007/s10584-025-03885-9
- Heuer, T., Gerson, Z., and Chen, K. (2025). *MA Appeals Court Sets New Precedent Protecting Solar Development in Local Permitting*. Foley Hoag. Available online at: <http://foleyhoag.com/news-and-insights/blogs/energy-and-climate-counsel/2025/july/ma-appeals-court-sets-new-precedent-protecting-solar-development-in-local-permitting/> (Accessed November 5, 2025).
- Katz, J., and Baillargeon, N. (2025). Balancing participation and speed: a polycentric governance lens on renewable-energy siting. *Policy Stud. J.* doi: 10.1111/psj.70091
- Mai, T., Lopez, A., Marquis, M., Gleason, M., Hamilton, A., Trainor-Guitton, W., et al. (2025). *Land of Opportunity: Potential for Renewable Energy on Federal Lands (No. NREL/TP-6A40-91848)*. Golden, CO: National Renewable Energy Laboratory. doi: 10.2172/2522746
- Manning, A. J. (2023). *Clearing Forests to Erect Solar Panels May not be Clean-Energy Solution*. Harvard Gazette. Available online at: <https://news.harvard.edu/gazette/story/2023/10/clearing-forests-to-erect-solar-panels-may-not-be-clean-energy-solution/> (Accessed November 9, 2025).
- Mass. Gen. Laws ch. 23J, § 1.
- Mass. Gen. Laws ch. 40A, § 9.
- Merzbach, S. (2025a). *Lawsuit Over Shutesbury Solar Zoning Dropped*. Greenfield Recorder. Available online at: <https://recorder.com/2025/08/26/shutesbury-solar-lawsuit-dismissed/> (Accessed December 2, 2025).
- Merzbach, S. (2025b). *PureSky pauses Shutesbury Solar Projects After Court Ruling*. Amherst Bulletin. Available online at: <https://amherstbulletin.com/2025/09/07/puresky-pauses-shutesbury-solar-projects-after-court-ruling/> (Accessed February 18, 2026).
- Nilson, R., Rand, J., Hoen, B., and Elmallah, S. (2024). Halfway up the ladder: developer practices and perspectives on community engagement for utility-scale renewable energy in the United States. *Energy Res. Soc. Sci.* 117:103706. doi: 10.1016/j.erss.2024.103706
- O'Shaughnessy, E., Nilson, R., and Rand, J. (2025). Go slow to go fast? A review of the impacts of permitting on large-scale solar project development. *Energy Res. Soc. Sci.* 127:104318. doi: 10.1016/j.erss.2025.104318
- Posit Team (2024). *RStudio (Version 2024.04.2) [Computer software]*. Posit Software, PBC. Available online at: <https://posit.co/products/open-source/rstudio/>
- R Core Team (2024). *R: A Language and Environment for Statistical Computing (Version 4.4.1) [Computer software]*. R Foundation for Statistical Computing. Available online at: <https://www.r-project.org/>
- Richardson, J., Kirk Hall, P., and Morgan, W. (2022). *Land Use Conflicts Between Wind and Solar Renewable Energy and Agricultural Uses (SSRN Scholarly Paper No. 4042235)*. Social Science Research Network. Available online at: <https://papers.ssrn.com/abstract=4042235> (Accessed November 9, 2025).
- Saint-Val, Y. (2025). *Appeals Court Sides with Solar Proponent in Local Permitting Fight*. Anderson Kreiger. Available online at: <https://andersonkreiger.com/appeals-court-sides-with-solar-proponent-in-local-permitting-fight/> (Accessed November 9, 2025).
- Siting Solutions Project (2025). *Renewable Energy Siting Policy Field Guide. Clean Tomorrow*. Available online at: https://sittingsolutions.com/wp-content/uploads/2025/12/Renewable-Energy-Siting-Policy-Field-Guide.pdf?link_id=3andcan_id=62f34eed5cb434607d47ae66f8e914d5andsource=email-this-giving-tuesday-we-celebrate-one-year-of-impactandemail_referrer=email_3017084andemail_subject=siting-solutions-project-releases-renewable-energy-siting-policy-field-guideandand (Accessed November 18, 2025).
- Stokes, L. C., Franzblau, E., Lovering, J. R., and Miljanich, C. (2023). Prevalence and predictors of wind energy opposition in North America. *Proc. Nat. Acad. Sci.* 120:e2302313120. doi: 10.1073/pnas.2302313120
- U.S. EIA (2025). *Preliminary Monthly Electric Generator Inventory (Based on Form EIA-860M as a Supplement to Form EIA-860)*. Available online at: <https://www.eia.gov/electricity/data/eia860m/> (Accessed May 15, 2025).
- Wear, D., Wingenroth, J., and Bartuska, A. (2025). *Converting Forests to Solar Facilities: Causes, Potential, and Implications*. Resources for the Future. Available online at: <https://www.rff.org/publications/reports/converting-forests-to-solar-facilities-causes-potential-and-implications/> (Accessed March 11, 2025).