GEORGETOWN CLIMATE CENTER

Local Ordinances for Climate Adaptation & Mitigation | Oct. 2025

Local Ordinances to Promote Wind, Solar, and Battery Energy Deployment

The Opportunity

Accelerating the pace of deployment of clean energy and eliminating emissions associated with the United States electric grid is critical to avoiding the worst impacts of climate change. Electric power generation contributes 25 percent of the country's overall carbon emissions, and other sectors are in the process of electrifying.[1] However, a confluence of factors is straining the electric grid, making the shift to a decarbonized grid more challenging. The artificial intelligence boom, electric vehicles, and increasingly electrified homes, buildings, and appliances have led to significant increases in overall demand for electricity for the first time in decades.[2] In order to reduce climate pollution without risking the reliability of the electric grid, fossil fuel generating resources like coal, oil, and natural gas power plants need to be replaced by lower carbon energy resources like wind, solar, and batteries. According to the National Renewable Energy

[1] *Sources of Greenhouse Gas Emissions*, EPA (March 2025), https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

[2] Energy Information Agency, *After more than a decade of little change, U.S. electricity consumption is rising again,* (May, 2025), https://www.eia.gov/todayinenergy/detail.php?id=65264#

Laboratory, reaching 95 percent grid decarbonization by 2035 will require an additional 60 GW a year of solar alone between 2025 and 2030, and an additional 15 GW of solar between 2030 and 2035.[3] At present, the United States is not on track to meet these goals; the speed of renewable energy deployment must increase.[4]

According to initial analysis, a record-breaking 50 GW of solar energy was brought online in 2024,[5] but that pace is expected to decline sharply over the next several years, in response to recent changes in federal policy.

The principal barriers to accelerating clean energy deployment and decarbonizing the United States electric grid are not technological — they are challenges of politics, governance, and community engagement. One of these challenges is local government and community opposition to the siting of wind, solar, and battery storage facilities, which has frequently led to delayed or cancelled projects. In a 2024 study by Lawrence Berkeley National Laboratory, developers and other industry experts cited community opposition and restrictive local ordinances as among the top causes of project cancellation.[6] Local opposition is reflected in a variety of local government ordinances and regulations around the country. In 2024, the Sabin Center found that 459 counties and municipalities had in place restrictions on clean energy development.[7]

Local concerns about the impacts of clean energy infrastructure can be exacerbated by processes that do not engage community residents adequately until project plans are already

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[3] Robert Margolis, NREL, *Solar Futures Study,* last updated April 21, 2025 https://www.nrel.gov/analysis/solar-futures#:~:text=To%20achieve%2095%25%20grid%20decarbonization.per%20year%20from%202025%E2%80%932030.

[4] Energy Information Agency, Solar, battery storage to lead new U.S. generating capacity additions in 2025 (Feb. 2025) https://www.eia.gov/todayinenergy/detail.php?id=64586#:~:text=In%202024%2C%20generators%20added%20a,solar%20capacity%20to%20be%20added

[5] See US Solar Market Insight, SEIA and Wood Mackensie, March 2025, at SMI-2024-YIR-ES.pdf

[6] *Large-scale wind and solar developers concerned about social factors affecting deployment,* Energy Markets and Policy, Berkeley Lab (Jan. 2024), https://emp.lbl.gov/news/larg-e-scale-wind-and-solar

[7] *The Energy Is About to Shift: Pathways to a Community-Centered, Resilient, and Decarbonized Grid for New England*, Acadia Center and Clean Air Task Force (2024), https://acadiacenter.wpenginepowered.com/wp-content/uploads/2024/11/AC_CATF_EnergyShift_Report_2024_R10-1.pdf ; *Opposition to Renewable Energy Facilities in the United States: June 2025 Edition*, Sabin Center (June 2025), https://scholarship.law.columbia.edu/sabin_climate_change/251/

finalized. A 2022 study from the Massachusetts Institute of Technology concluded that 28 percent of opposition to renewable energy projects in the United States stemmed from a lack of procedural equity, meaning the process of community engagement, such as the community's ability to influence project outcomes, was inadequate.[8] In addition, frustration and a sense among community members that their communities are changing too quickly can be a roadblock.[9] In a 2024 paper, researchers at the University of Pittsburgh found that in some rural areas, opponents to clean energy see renewables "as a threat to farmlands and rural communities by causing farmland loss, jeopardizing tenant farmers' livelihoods and marring the rural landscape."[10] Absent meaningful solutions, these trends are likely to continue to worsen as electricity demand rises and more infrastructure is needed in response to AI-driven electricity consumption and economy-wide electrification.

While the challenges clean energy development faces at the local level are significant, they are not insurmountable. Best practices and resources have emerged that can help local governments, as well as project developers, address community concerns. For instance, New York State's Office of Renewable Energy Siting (ORES) has issued model ordinances for clean energy resources like wind and solar energy that suggest local laws on everything from decommissioning plans and land use regulations to comprehensive clean energy planning.[11] Local governments have also led the way in establishing examples of how to provide developers, as well as state siting authorities, with transparent access to information about community priorities and concerns.

This paper focuses on steps local governments and others can take to help air and address local concerns early, rather than leaving concerns to the back-end of project development processes, when project modifications may be infeasible and delays can result in project cancellation. Direct and early engagement with local community members by local government

[8] *Beyond infrastructure: Building a supportive community and policy environment*, Acadia Center and Clean Air Task Force (Jan. 14, 2025), https://acadiacenter.org/beyond-infrastructure-building-a-supportive-community-and-policy-environment/

[9] *Digging Deep to Understand Rural Opposition to Solar Power*, Inside Climate News (Sept. 26, 2024), https://insideclimatenews.org/news/26092024/inside-clean-energy-solar-power-rural-opposition/

[10] Shanti Gamper-Rabindran and Joshua Ash, *"Farming the sun" or "coal legacy"? Social perspectives on solar energy projects in Appalachia*, Energy 117 Research and Social Science (Nov. 2024), https://www-sciencedirect-com.gt-law.idm.oclc.org/science/article/pii/S2214629624002470#:

[11] *Empowering Municipalities to Manage Responsible Clean Energy Development,* https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Siting-Resources

leaders, local industry representatives, and neutral experts can improve communication and establish community-tailored roadmaps for developers as well as energy system planners to follow.

As national trends demonstrate, community opposition to energy facility siting is an issue in many locations with significant potential for renewable energy, such as rural or coastal communities. Favorable conditions for renewable energy deployment, such as low-cost land or access to needed energy infrastructure, can attract interest from renewable energy developers from outside the community. However, if there is no advance work to educate and inform community members about the options for and impacts of introducing renewable energy into the community, and to assess and protect community priorities (e.g, landscapes or habitats) then the sudden presence of project developers who are not familiar with local priorities can spark community opposition. The widespread nature of this phenomenon means energy planners cannot sidestep this problem by simply avoiding communities that oppose renewable energy projects. Successful deployment of clean energy requires increased understanding of the concerns local residents have, along with the incorporation of community members' priorities into local zoning and development policies. The nation's ability to achieve the levels of clean energy needed to reduce the impacts of climate change, while maintaining a reliable electric system despite rising demand for electricity, hinges on stronger communication at the local level about renewable energy and increased visibility into local priorities.

This paper describes actions municipal governments could adopt in the form of an ordinance to improve public engagement around clean energy siting. It also articulates criteria for identifying communities where implementing local engagement processes can foster informed and productive engagement on the benefits and impacts of energy facilities, and ensure that community concerns are addressed early and adequately in clean energy planning and permitting processes.

Proposed ordinance

To increase the pace of clean energy deployment while improving the compatibility of energy infrastructure with community priorities, we recommend communities pursue the creation of energy-focused public engagement committees tasked with collecting information from a variety of sources and then drafting a set of community principles and priorities, which can be published as-is or refined further as needed and adopted in code by local zoning officials.

A public engagement committee is essentially a task force deputized by the relevant local body of government, such as a county or city planning commission or board of commissioners, to collect and share reliable and diverse information about the impacts and benefits of potential energy development, to solicit input from other community members and stakeholders, and to make recommendations to local governments for the adoption of a codified statement of principles and priorities for energy development. In this case, the committee would provide a forum for information-sharing and collect input from local community members, including residential communities, chambers of commerce, environmental organizations, and others, and collate that input into a set of shared principles and priorities for local development of energy facilities.

An ordinance without a community engagement process is unlikely on its own to substantially reduce the risk of community opposition to renewable energy or battery storage projects. For that reason, our recommendations in this memo focus on a two-phase process every community can initiate — ideally, before development pressures become urgent — which starts with engagement and culminates in an ordinance.

Phase 1: Comprehensive, inclusive public engagement to surface and seek consensus around the perceived risks and potential benefits of clean energy development in the specific context of that community and the types of potential energy projects at issue, if known.

Phase 2: Incorporation of the community's concerns and values (including details such as environmental and community priorities) into a zoning ordinance or regulation that states where, when, and under what conditions the community would like clean energy development to proceed. Ideally, this ordinance will include details such as environmental or landscape protection priorities and preferred community benefits and impact mitigation measures.

Phase 2 can be broken down into the following four main steps:

1. The local government (e.g. county zoning commission, city council) establishes one or more committees to address specific areas of community interest, such as: (a) the impacts and benefits of clean energy generation to agricultural traditions; (b) environmental protection priorities; and (c) community benefits preferences.

2. Each committee holds public meetings at regular intervals over a specified period of time. Committees provide information to and solicit feedback from stakeholders including community members, neutral experts, and clean energy developers.

3. The committees then convene to collectively develop a set of recommendations based on community input, which they provide to the local government body of jurisdiction (e.g. county planning commission).

4. Finally, the local body of government passes an ordinance that codifies the recommendations of the stakeholder committees into a statement of principles—along with any relevant revisions to the municipality's zoning codes—that expresses the community's priorities and identifies preferred areas for clean energy development. Alternatively, the report can be published unofficially without being adopted into code.

Under this model, once the committees have developed a set of recommendations, the relevant body of government would incorporate the principles in that report into local laws, either by amending zoning ordinances for clean energy facilities or, when local authority over clean energy facility siting is preempted by state government authority, by codifying a statement of principles that clearly documents local priorities. Publicly documented local priorities can provide a roadmap for project developers and can guide local government engagement in future permitting approvals processes, including any participation in state-level adjudications. This information may also be useful to system planners and policymakers, such as when planning likely routes for transmission infrastructure.

Experts highlight that early engagement with key stakeholders is an important strategy to ensure the successful implementation of this ordinance. Researchers at the University of Michigan found that the perceived legitimacy of renewable energy siting processes was highly dependent on the standing of committee leaders in their respective communities.[12] As they select individuals to lead and facilitate these public engagement processes, local leaders should therefore weigh credibility with the community. Once public engagement committees have been established, those committees should engage in proactive and meaningful outreach, education,

[12] See *The Science of Siting Clean Energy: Bridging Planning, Policy, and Practice*, Clean Air Task Force and Graham Sustainability Institute at 8 (Jan. 2024), https://graham.umich.edu/media/files/CATF_ScienceofSiting_Report.pdf ("Augment the capacity of local leaders to increase engagement in both renewable energy planning and community benefit agreements development by creating local task forces and connecting them with locally trusted facilitators and technical assistance.").

and information-gathering, preferably in advance of major siting applications. It is worth noting, however, that this process has also been successful in certain cases where community conflict with renewable energy developers is already significant.

General best practices

The adoption of a local ordinance documenting community preferences for clean energy siting and impact mitigation can serve several purposes. In developing the recommendations that form the basis of these ordinances, local communities can identify specific cultural, environmental, and other resources they consider high priorities, and learn about and evaluate preferred options for mitigating the impacts of new infrastructure on these resources. Publishing this information in the form of a local ordinance can then help future clean energy developers craft project plans that address local priorities and preferences. In addition, public engagement committees can help address misinformation among residents and other stakeholders and advance understanding of the risks and benefits of various technologies, while providing information that policy makers and regional bodies can use for planning.

This approach is responsive to multiple studies published over the past several years that have observed an increase in local community opposition to both renewable energy and battery storage projects.[13] It also incorporates input and information from consultation with state agency officials, academics, and clean energy development experts.

Public engagement committees have the potential to allow communities to move beyond protracted fights over individual projects by emphasizing long term planning that brings clean energy development into alignment with other community zoning priorities.

Where has this been tried?

Linn County, Iowa, offers a case study of how bringing the community into the planning process can remove barriers to clean energy siting. In this example, this process was initiated after the local government had moved to temporarily ban clean energy development in response to community concerns. However, the process Linn County followed provides a useful template for any community that expects clean energy development to be an issue in the future.

[13] *Opposition to Renewable Energy Facilities in the United States: June 2025 Edition*, The Sabin Center (June 2025), http://scholarship.law.columbia.edu/sabin_climate_change/251/.

In 2022, the Linn County Board of Commissioners issued a one-year moratorium on all clean energy development, following a significant increase in wind and solar development over a short span of time.[14] In response, the Great Plains Institute (GPI) worked with the county to develop a process to incorporate community concerns into a new ordinance that enabled the county to lift its moratorium.[15] The public engagement process Linn County undertook led to the adoption of a more sustainable long-term regulatory structure that reflected local input. Linn County is therefore an example of how meaningful public engagement can resolve conflicts among community members, local officials, and renewable energy developers, even where there is significant concern among community members and local leaders about clean energy development.

The process that Linn County developed and implemented with the help of GPI serves as a model for the best practice we recommend. Starting in 2023, Linn County developed four advisory councils on clean energy development: a Good Neighbor Practice Committee, a Battery Energy Storage Systems (BESS) Committee, a Balance Agriculture and Solar Committee, and a Lifecycle Costs Committee.[16] Prospective committee participants submitted applications to the Linn County Board of Supervisors, which selected members to serve on each body.[17]

Importantly, the Linn County committee process was both iterative and public. Seven months after they were created, the committees reported findings and recommendations to the public, solicited public comment, and incorporated feedback into recommendations to the Linn County Board of Commissioners in May 2023.[18] Additional input was also solicited by the Board and on the county website.[19] The County Board of Supervisors ultimately incorporated each

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[14] *Linn County Renewable Energy Committees Seeking Feedback*, Linn County (April 24, 2023), https://www.linncountyiowa.gov/CivicAlerts.aspx?AID=3204&ARC=5626&.

[15] Case Study: Solar Development in Iowa's Agricultural Communities, Great Plains Institute, https://betterenergy.org/linn-county-case-study/ (last visited July 2025).

[16] *Renewable Energy Review Committees*, Linn County (2023), https://www.linncountyiowa.gov/1705/Renewable-Energy-Review-Committees

[17] *Id.*

[18] *Linn County Renewable Energy Review Committees*, Linn County (October 21, 2023),https://www.linncountyiowa.gov/CivicAlerts.aspx?AID=3367&ARC=5944

[19] Id.

committee's final statement into a model ordinance amendment, and the clean energy generation moratorium was lifted in September, 2023.[20] The Board Chair praised the process, stating that, “I am pleased with the amount of time and work our Planning & Development staff and citizen-led Renewable Energy Committees put into developing a much-improved ordinance regarding utility-scale solar projects in Linn County.”[21]

While Iowa lacks centralized state permitting for energy facilities, and therefore Linn County had authority to issue a local moratorium on clean energy development, a modified version of this best practice can be useful in states with centralized permitting to encourage faster and community-compatible clean energy development. In states where local authority over clean energy development is preempted by state law, local governments and community members typically have the right to participate in permitting processes, and local concerns can be key factors in project approvals or denials.[22] Clean energy developers are often still required by the state to show meaningful engagement with and agreement from local governments.[23] A local government in a state with centralized state permitting can pass an ordinance that formalizes community preferences into a statement of priorities for clean energy development. Addressing these concerns in a statement of principles before state siting processes have begun can help developers to avoid unnecessary impacts, prevent unnecessary delays in the state siting process, and ultimately increase the pace of renewable energy deployment while enabling host communities to reap the benefits of clean energy development.

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[20] News Flash, Linn County https://www.linncountyiowa.gov/CivicAlerts.aspx?AID=3367&ARC=5944 (last accessed October, 2023).

[21] *Linn County Board of Supervisors Approves Updated Utility-Scale Solar Ordinance,* Linn County (October 2023) https://www.linncountyiowa.gov/CivicAlerts.aspx?AID=3367&ARC=5944

[22] *See, e.g.,* Order 88021,Case No. 9411, Maryland PSC (Feb. 2017), https://webpscxb.psc.state.md.us/DMS/case/9411 (order denying a solar project CPCN due to local opposition)(supra).

[23] *See, e.g.*, Md. Code Pub. Util. § 7-207(e)(1)(requiring the Maryland Commission to take “due consideration” of impacted municipality recommendations).

this information in the form of a local ordinance can then help future clean energy developers craft project plans that address local priorities and preferences. In addition, public engagement committees can help address misinformation among residents and other stakeholders and advance understanding of the risks and benefits of various technologies, while providing information that policy makers and regional bodies can use for planning.

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Identifying potentially promising local jurisdictions

We suggest prioritizing communities based primarily on strong potential for clean energy and/or battery storage development, due to land availability and/or proximity to grid infrastructure.

It is worth noting that communities that are currently grappling with proposed clean energy development almost certainly already have residents and other stakeholders voicing opposition to that development. This approach – community engagement, followed by ordinances articulating the parameters within the community will support clean energy facility siting – is valuable everywhere, but is especially important in communities like these that are currently on the leading edge of the clean energy transition.

In general, any community with land availability and proximity to grid infrastructure is likely to be a hot spot for future development, and it is essential to begin to address endemic levels of community concern. There is little to be gained by ignoring or sidestepping community concerns; as some have put it, “The only way out is through.”

[24] *Opposition to Renewable Energy Facilities in the United States: June 2025 Edition*, The Sabin Center (June 2025), http://scholarship.law.columbia.edu/sabin_climate_change/251/.

About this Research

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Cover image: Solar panels in a field with a neighborhood in the background. Creative Commons License.