

## A University-based Clinical Approach to Renewable Energy Facility Siting in the United States

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### Summary:

The licensing and siting of new renewable energy facilities in the United States is facing growing resistance from communities who perceive the process as inequitable or unfair. We propose that a national consortium of university-based clinics could help minimize conflicts by facilitating joint fact-finding and collaborative problem-solving.

### Keywords:

Renewable Energy, Facility Siting, Clinical Education, Conflict Resolution, Energy Justice, Energy Transition

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## Main text

Meeting U.S. decarbonization goals requires a rapid transition to renewable energy. To achieve net-zero carbon emissions in the U.S. by 2050, utility-scale wind and solar capacity must expand by an estimated 38–67 GW per year by 2030.<sup>1</sup> In the past two years, three landmark pieces of legislation—the Inflation Reduction Act, CHIPS and Science Act, and Infrastructure Investment and Jobs Act—have made these goals more reachable by directing \$400 billion towards clean energy research and development.<sup>2</sup>

With national policy now focused on accelerating clean energy adoption, and much of the required technology readily available and proven to be cost-effective, one key challenge remains: ensuring that proposed new renewable energy projects are not blocked by local opponents. Growing resistance has already slowed the necessary transition. Understanding the sources of local resistance and changing the way the facility siting process works are essential next steps.

### Fragmented and Inequitable Siting Processes

Community concerns about renewable energy projects are often dismissed as NIMBYism (Not-In-My-Backyard-ism),<sup>3</sup> but our analysis of more than 53 case studies of siting conflicts<sup>4</sup>—representing 4.6 GW of potential renewable energy generating capacity that were never installed—shows that opponents often have legitimate reasons for pushing back. Stakeholders across the country have raised concerns about possible adverse environmental and aesthetic impacts, potential reductions in property value, perceived or real threats to safety and public health, inadequate Tribal consultation, or lack of public accountability. Existing siting regulations do not require new facilities to minimize, rectify or compensate for adverse impacts. So, it is not a surprise that opponents concerned about these possible injustices will oppose new projects.

In a typical renewable energy siting process (Figure 1), a developer proposes a new project, prepares initial assessments, and seeks permits before any substantial engagement with local stakeholders begins. Then, formal public meetings allow residents and business owners to object, but do not require collaborative problem-solving, joint fact-finding or discussion of possible changes in the proposed plan.<sup>5</sup> Historically, regulations only mandate that minimum conditions be met. This typical approach may lead to last-minute concessions on the part of the developer but is as likely to lead to lawsuits and protracted protests.<sup>4</sup>

In a 2023 report, the Sabin Center for Climate Change Law found evidence of 225 local restrictions to renewable energy development across 35 states, illustrating the growing significance of local concerns.<sup>6</sup> In response, federal policymakers have proposed “streamlining” regulatory requirements (like Environmental Impact Assessments) and categorically exempting renewable energy projects from local

review.<sup>7</sup> At the state level, New York and California recently adopted legislative initiatives aimed at speeding up facility licensing.<sup>7</sup> This risks simply ignoring community concerns instead of finding ways to make the siting process more just in the eyes of those who are protesting.

There is no universal definition of fairness in siting. The current siting process and prevailing regulations require no response to public concerns as long as minimum health and environmental safety standards have been met. A growing literature on energy justice spells out three different types of fairness that ought to be met: distributional, procedural, and recognitional.<sup>8</sup> Distributional justice emphasizes fair outcomes in the allocation of resources, costs, and benefits. Procedural justice ensures fair representation and inclusivity in energy system decision-making. Recognitional justice acknowledges past harms or wrongs and seeks to redress them. Renewable energy can be a tool for advancing energy justice in all of these terms, but not until federal, state, and local facility siting regulations are changed.

Techno-economic factors, such as the availability of undeveloped land and distance to transmission networks, often channel large-scale solar and wind projects into rural or low-income areas.<sup>9</sup> An equitable siting process would enable these under-resourced communities to be consulted in siting decisions and compensated for the harms the facilities might cause. Increased participation can increase the likelihood that benefits will be distributed fairly,<sup>10</sup> as stakeholders are better able to advocate for their own interests.

It is unclear whether renewable energy projects in general should be viewed as a net positive for a hosting community. Projects can increase tax revenue, provide employment opportunities, and lower the cost of electricity, but they can also push out other land uses and cause local environmental and aesthetic harm.<sup>11</sup>

Creating a more equitable and efficient process for siting renewable energy facilities is essential to achieving a just energy transition. Future facility siting procedures should take account of the multiple dimensions of energy justice.

## **Go Slow to Go Fast: A Clinical Approach**

<Figure 1 here>

Given the unique circumstances surrounding opposition in each locality, case-by-case consensus building—rather than a general technical or procedural solution—is needed to broker fair and efficient agreements. We propose a clinical approach to siting large-scale renewable energy projects using what is known as the Environmental Collaboration and Conflict Resolution (ECCR) framework. ECCR is a time-tested form

of alternative dispute resolution involving proactive problem-solving for environmental or natural resource conflicts.<sup>12,13</sup> ECCR requires a credible, “neutral” party to convene the disputants. Private developers, the most prominent proponents of new facilities, are not likely to be seen as credible conveners of a problem-solving forum, although they must be involved. Likewise, regulators are usually prohibited from working with proponents to revise permit requests, but they are certainly entitled to observe local problem-solving efforts.

In the clinical model we propose and will pilot at MIT, a university or college clinic would partner with a professional mediator to convene the relevant participants. Universities have rarely played the convening role we prescribe,<sup>15</sup> although many are well-equipped to do so.<sup>16</sup> Professional mediators are the key to facilitating the collaborative problem-solving process once the university clinic convenes the relevant stakeholders. In some parts of the U.S., it has been possible to mediate renewable energy siting conflicts through state and federal offices,<sup>12</sup> but they are rarely empowered to provide a neutral forum or play a convening role. A university clinic can provide a place for all relevant stakeholders to meet (out of the media spotlight) to talk about their interests, concerns, and differences. However, the clinic would not make substantive suggestions regarding redesign or relocation of a facility, which would be up to the participating stakeholders.

We acknowledge that in certain circumstances, universities or colleges might not be perceived as neutral by some stakeholders. For example, the university might stand to benefit from a new facility. If the university has any kind of financial stake in a proposed renewable energy facility, that university’s clinic could not play the kind of neutral convening role we are describing. Similarly, if the university receives funding from a specific energy company involved in a proposed project, the university clinic’s neutrality might be compromised. The role of the university in the clinical model we propose is not a paid consulting role. Universities and colleges, particularly in law and medical schools, have already been providing “learning by doing” opportunities for their students. Notably, many state universities have successfully played an Extension Service Role over the years, offering their evidence-based resources to help nearby agriculturalists on a pro-bono basis.<sup>17</sup>

The students (both graduate and undergraduate) could be trained by the faculty, as part of a formal course listed at the university, before being assigned to assist a client community. Students and faculty in a clinic, paired with a professional mediator, should always begin by preparing a formal stakeholder assessment.<sup>14</sup> Based on this set of confidential conversations with all the possible parties, the clinic and the mediator would invite representatives from the key stakeholder groups—including residents, environmental advocacy groups, business interests, community non-profits, Tribal entities, and the developer—to participate in a collaborative problem-solving effort, closed to the media and the general public. The final output of the clinic’s involvement

would presumably be a revised project proposal, but that would be up to the developer. Before submitting a revised proposal to the relevant permitting agency, the clinic would hold an open public meeting at which the participants would be able to say why they support the revised proposal. This would promote public accountability. If the process succeeds, most community opposition would cease or reduced substantially. The permitting agency can assign staff to observe the informal clinic conversations so the regulators will know what happened and why, even if they do not participate directly. The clinic would only proceed at the outset if all the key stakeholders at a specific site agree to participate.

Clinics of many kinds are already housed at universities and provide services free of charge. A potential question might emerge around funding university-based clinics when they offer their services for free — particularly for smaller, relatively under-resourced universities and colleges. Sometimes philanthropic support is possible. To ensure and maintain the university clinic's neutrality, financial support from individuals and entities directly involved in renewable energy development should be avoided. Students are trained and assigned to serve a client community in a for-credit class. Currently, professional mediators are already funded by federal and state grants and often operate pro-bono in public service cases,<sup>12</sup> so the university would only have to cover the salary of their own faculty member leading the Clinic, just like any other course. With a dedicated national consortium of clinics, university clinics could offer peer-to-peer support and jointly apply for federal, state, and philanthropic grants that could provide support for under-resourced members of the consortium.

<Figure 2 here>

### **An Efficient, Equitable, and Just Siting Process**

By going beyond the status quo, which offers minimal public engagement before official plans are submitted, we envisage that employing an ECCR approach through the clinical model would make siting more *efficient* in the long run. The clinical model could supplement the existing regulatory system. Because it only produces changes if the facility proponent prepares a revised proposal, the clinic has no power over the final project proposal. The existing development timeline—including siting, permitting, and construction—is time-consuming, taking an average of four years for utility-scale solar and wind projects.<sup>7</sup> While the clinical approach might lengthen the initial part of the siting process by a few months, it will result in a shorter overall timeframe by avoiding costly litigation, essentially “going slow to go fast” (Figure 1). Indeed, ECCR-mediated

cases have been resolved in one-third of the time and required 79% fewer staff hours than litigated cases.<sup>12</sup>

The clinical model can achieve a more *equitable* siting process by embracing the tenets of an energy justice framework. Most importantly, procedural justice is enhanced when all relevant stakeholders have an equal opportunity to participate in joint fact-finding and collaborative problem-solving. If the facility proponents want to take advantage of community support and avoid opposition campaigns, they can work with a mediator and university students and staff to arrive at a version of their proposal that all parties can live with. Often this means agreeing not only to slight changes in facility location, scale, technology, and site design, but also compensatory and mitigatory measures that are not required by law. In addition, the clinical approach addresses distributional justice because under-represented or under-resourced stakeholders are invited to participate and empowered to co-create outcomes. It provides educational opportunities for students from diverse backgrounds and disciplines. The clinic can contribute credit towards graduation requirements, provide hands-on training and access to a career network through certification, and at the same time create a new generation of energy justice scholars and practitioners.<sup>8</sup>

Finally, the clinical model and ECCR address recognitional justice by preventing further repetition of the historically inequitable siting pattern of fossil fuel plants. University-based clinics can transform the university from an ivory tower into a community-oriented partner<sup>15</sup> that doesn't aim to tell anyone what to do but helps them reach informed agreements on their own.

## **Scaling Up: A National Consortium of University Clinics**

Drawing on MIT's "learning-by-doing" approach to education, the university clinic we aim to pilot will focus mainly on projects in our region. Similar clinics in other regions could offer the same kind of assistance in their area. Eventually, a national consortium of university-based renewable energy facility siting clinics—sharing learning materials and experiences—could work jointly to scale up the ECCR framework for resolving siting disputes, maximizing the advantages the approach offers (Figure 2). Using a consortium model will allow larger research universities to support smaller institutions, like community colleges, financially and technically enabling all types of institutions to take part. An analogous Consortium of University-based Cybersecurity Clinics was created in 2021 and scaled rapidly to help cities, NGOs, and small businesses address the risks they face from cyberattacks.<sup>18</sup> We envision a similar national knowledge-sharing effort. We need to learn how to bring proponents and opponents together to generate alternative facility designs, financial structures, mitigation plans, and compensation strategies. Though clinics are just one way to speed up the energy transition, if university clinics work together, reflecting on their field experience, they can

generate deeper understandings to help shape new regulations and siting legislation. The clinical approach could be a powerful way to remove a key obstacle to a just energy transition.

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### **Author Contributions**

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## References

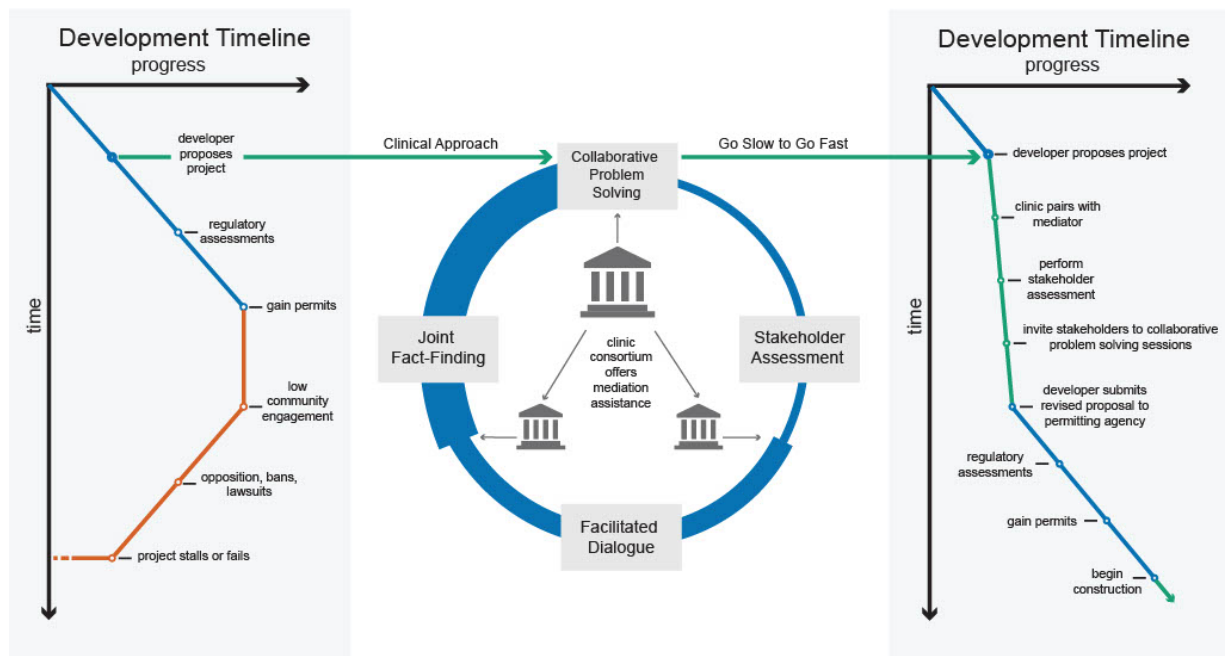
1. Jenkins, J.D., Mayfield, E.N., Larson, E.D., Pacala, S.W., and Greig, C. (2021). Mission net-zero America: The nation-building path to a prosperous, net-zero emissions economy. *Joule* 5, 2755–2761. 10.1016/j.joule.2021.10.016.
2. Carey, L., and Shepard, J.U. (2022). Congress’s Climate Triple Whammy: Innovation, Investment, and Industrial Policy. Rocky Mountain Institute. <https://rmi.org/climate-innovation-investment-and-industrial-policy/>.
3. Carley, S., Konisky, D.M., Atiq, Z., and Land, N. (2020). Energy infrastructure, NIMBYism, and public opinion: a systematic literature review of three decades of empirical survey literature. *Environ. Res. Lett.* 15, 093007. 10.1088/1748-9326/ab875d.
4. Susskind, L., Chun, J., Gant, A., Hodgkins, C., Cohen, J., and Lohmar, S. (2022). Sources of opposition to renewable energy projects in the United States. *Energy Policy* 165, 112922. 10.1016/j.enpol.2022.112922.
5. Bailey, I., and Darkal, H. (2018). (Not) talking about justice: justice self-recognition and the integration of energy and environmental-social justice into renewable energy siting. *Local Environment* 23, 335–351. 10.1080/13549839.2017.1418848.
6. Aidun, H., Elkin, J., Eisenson, M., Goyal, R., Marsh, K., McKee, N., Welch, M., Adelman, L., and Finn, S. (2023). Opposition to Renewable Energy Facilities in the United States: May 2023 Edition. Sabin Center for Climate Change Law.
7. Bird, L., and McLaughlin, K. (2023). US Clean Energy Goals Hinge on Faster Permitting (World Resources Institute).
8. Sovacool, B., and Dworkin, M. (2014). Global Energy Justice: Problems, Principles, and Practices 10.1017/CBO9781107323605.
9. O’Shaughnessy, E., Wisner, R., Hoen, B., Rand, J., and Elmallah, S. (2022). Drivers and energy justice implications of renewable energy project siting in the United States. *Journal of Environmental Policy & Planning* 0, 1–15. 10.1080/1523908X.2022.2099365.
10. Baxter, J. (2017). Energy justice: Participation promotes acceptance. *Nat Energy* 2, 17128. 10.1038/nenergy.2017.128.
11. Levenda, A.M., Behrsin, I., and Disano, F. (2021). Renewable energy for whom? A global systematic review of the environmental justice implications of renewable energy technologies. *Energy Research & Social Science* 71, 101837. 10.1016/j.erss.2020.101837.
12. Environmental Collaboration and Conflict Resolution (ECCR): Enhancing Agency Efficiency and Making Government Accountable to the People (2018). (Federal Forum on Environmental Collaboration and Conflict Resolution).
13. O’Leary, R., and Bingham, L. (2004). Promise and Performance of Environmental Conflict Resolution 1st Edition. (RFF Press).
14. Susskind, L., and Thomas-Larmer, J. (1999). Conducting a Conflict Assessment. In *The Consensus Building Handbook: A Comprehensive Guide to Reaching Agreement* (SAGE Publications).
15. Kearney, J., Wood, L., and Zuber-Skerritt, O. (2013). Community–University Partnerships: Using Participatory Action Learning and Action Research (PALAR). *Gateways* 6. 10.5130/ijcre.v6i1.3105.



16. Fishman, X., Jacobs, J., Minott, O., Tesfaye, M., and Winkler, A. (2023). Empowering Communities while Streamlining Clean Infrastructure Permitting. Bipartisan Policy Center. <https://bipartisanpolicy.org/blog/clean-infrastructure-permitting/>.
17. Extension | National Institute of Food and Agriculture United States Department of Agriculture. <http://www.nifa.usda.gov/about-nifa/how-we-work/extension>.
18. Our Member Organizations Consortium of Cybersecurity Clinics. <https://cybersecurityclinics.org>.

[Figure 1. Title]

**Figure 1. Go Slow to Go Fast: A Clinical Approach to Renewable Energy Facility Siting**

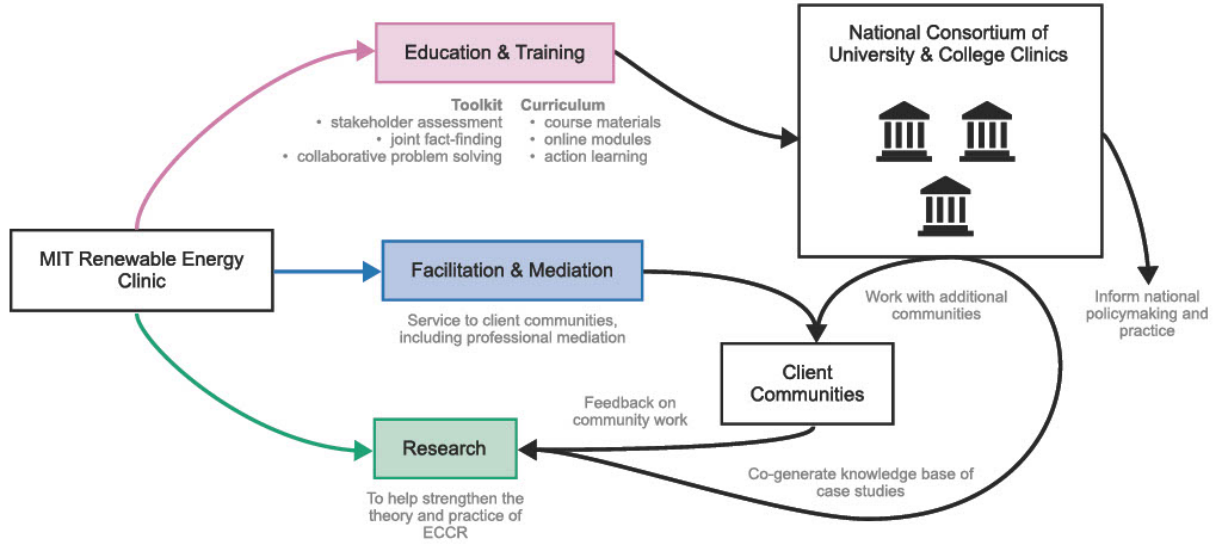


[Figure 1. Legend]

Applying an ECCR framework to renewable energy development can transform a typical siting and permitting process (shown on the left) by providing credible consultation and collaborative problem-solving during the early stages of a project. The clinical process meets the tenets of an energy justice framework and avoids costly delays, leading to a more just and efficient siting process (shown on the right).

[Figure 2. Title]

**Figure 2. A Multi-Pronged Clinical Model with Three Interconnected Functions: Education, Mediation, and Research**



[Figure 2. Legend]

The clinical approach to be piloted at MIT will engage diverse stakeholders in resolving renewable energy siting conflicts efficiently and equitably. By scaling to a national consortium of university-based clinics, a network of students, educators, mediators, and communities could partake in knowledge-sharing and participatory action learning that would better enable a just energy transition.