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IMPLICATIONS OF ZONING ORDINANCES ON SOLAR DEPLOYMENT AND DECARBONIZATION IN THE GREAT LAKES REGION

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Local zoning ordinances play a key role in shaping the development of utility-scale solar photovoltaics (PV) across the country. While ordinances are often intended to protect public health and safety, they can also limit and increase the costs of development. This research examined how local zoning ordinances across the Great Lakes region might impact the development of utility-scale photovoltaics (PV) and the decarbonization efforts of the broader power sector. By quantifying the role of ordinances on power sector decarbonization, this study demonstrates the importance of aligning local zoning laws with state and regional goals.

Key findings:

1. **Significant solar deployment is lost:** Existing local solar zoning ordinances across the Great Lakes region could cause an 18% decrease in utility-scale solar deployment by 2040, equating to roughly 8 GW (gigawatts) less solar capacity built, compared to a scenario with no local zoning constraints. Instead, more wind, natural gas, and battery energy storage (BESS) are built.
2. **Higher Costs for Decarbonization:** Current solar zoning rules raise system-wide decarbonization costs by 1% (about $1 billion), as utilities must rely on lower-quality or more expensive sites, or switch to other more expensive energy technologies. These added costs could ultimately impact ratepayers.
3. **"Silent" ordinances are the biggest barrier:** The majority of the lost capacity stems from communities whose zoning laws do not mention solar at all. Over one-third of zoning ordinances in the region are silent on PV, and since all of these states have "permissive" zoning, solar is presumed to be prohibited unless it is explicitly permitted. Silent ordinances were found to remove many prime solar sites from consideration, more than explicit bans or strict setback rules.
4. **State-by-state impacts vary:** States like Michigan, Wisconsin, and Ohio (with many restrictive or silent ordinances) could experience solar investment losses of up to 42%, while states with clearer, more supportive zoning (e.g., Indiana, Minnesota) attract more development.
5. **If "silent" zoning ordinances are clarified, solar could rebound:** In an expanded zoning scenario, where all silent ordinances are updated to either allow or ban solar (following the same proportions as the current non-silent ordinances in the region), the reduction in solar deployment is only 3% (around 1.5 GW). Turning implicit bans into explicit decisions could significantly boost solar investment relative to current trends.

Summary of Methods

Access the paper describing the complete methodology **here**.

1. Compiled ~2,500 local zoning ordinances and related rules, covering over 90% of townships in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. [You can read more about this in our **Solar Zoning Factsheet**.]
2. Mapped developable land in each township using zoning rules and geographic constraints. [See inset at right demonstrating how setbacks were applied to roads and property lines.]
3. Created supply curves (i.e., how much land could theoretically be developed into solar, and at what cost) across townships.
4. Integrated supply curves into a regional power system model that co-optimizes generation and transmission investments under an 80% CO_2 reduction target by 2040.
5. Evaluated three scenarios:
   i. No zoning restrictions (i.e., the normal way power system models are run),
   ii. All current zoning rules applied,
   iii. And, jurisdictions updated to allow or ban solar following the same proportions as the current non-silent ordinances in the region. [See Table 1 below]

Table 1. Power System Model Outputs, by Solar Zoning Scenarios

Cost category	Power System Model Outputs, by Zoning Scenario			Percentage change	
	No zoning restrictions	Current zoning	Expanding zoning in silent jurisdictions	No zoning to Current zoning	No zoning to Expanding zoning
PV built	42 GW	34 GW	40 GW	-18%	-3%
Total energy system (PV + other technology) investment cost	$142B	$143B	$142B	+1%	< 0.5%

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