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## Siting Utility-Scale Solar and Wind in Iowa A Guide for Local Governments

*The information and work presented herein was funded in part by Energy Foundation. This guide was authored by Jenna Greene, Brian Ross, and Jessi Wyatt.*



*Photo from National Renewable Energy Laboratory by Dennis Schroeder*

### SUMMARY

Solar and wind energy, resources that are abundant throughout the state of Iowa, are among the least expensive forms of electric generation in the country—and costs of both solar and wind energy systems are forecast to continue declining. Market activity in renewable energy development is expected to continue increasing well into the future.

This guide provides Iowa communities with an overview of long-term utility- and community-scale solar and wind development—systems sized one megawatt (MW) or greater. Understanding the long-term context helps communities make informed decisions in evaluating renewable energy proposals and creating plans about how future development should happen.

The Great Plains Institute is engaging local governments across the Upper Midwest on long-term planning for renewable energy. Additional guides are available on the Great Plains Institute website: [www.betterenergy.org](http://www.betterenergy.org). This guide builds upon the work of Iowa Environmental Council and Center for Rural Affairs on [best practices in solar siting ordinances in Iowa](#).



# SUMMARY OF RENEWABLE ENERGY SITING AUTHORITY

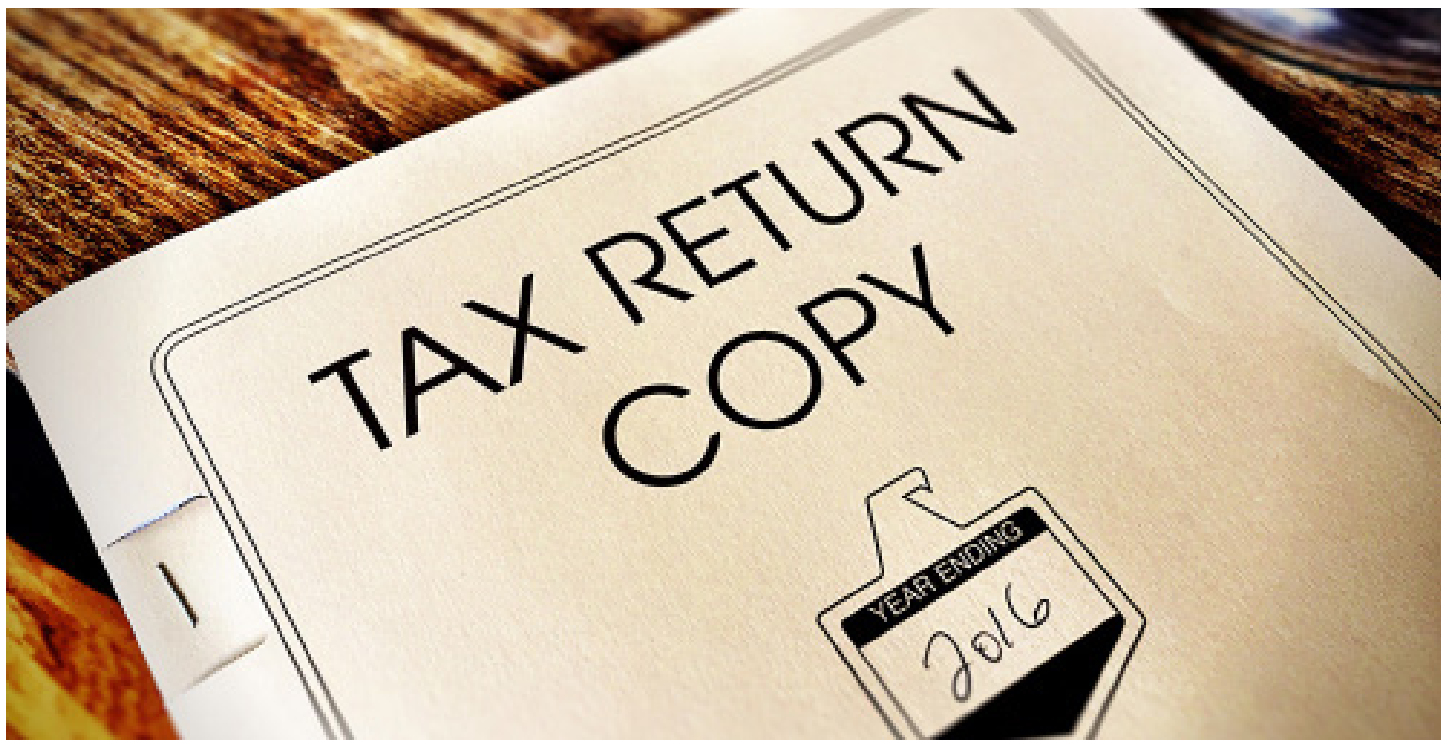
Unlike some of Iowa’s neighboring states, all land use and permitting authority in Iowa for utility- and community-scale wind and solar energy projects resides at the local level. Additional certificates are granted by state bodies for projects larger than 25 MW capacity, but these projects are still subject to local land use controls. Zoning and land use standards vary widely across local governments. Table 1 provides an overview of siting authority by project type and size.

**Table 1. Iowa Siting Authority**

ROLES	STATE	LOCAL
<b>Large wind energy projects</b> (25 MW or more)		<b>X</b>
<b>Small wind energy projects</b> (less than 25 MW)		<b>X</b>
<b>Solar energy systems</b>		<b>X</b>

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# SUMMARY OF TAXATION AND LOCAL REVENUE



Utility-scale solar and wind development provide direct economic benefits to the community where they are located through property tax revenue.

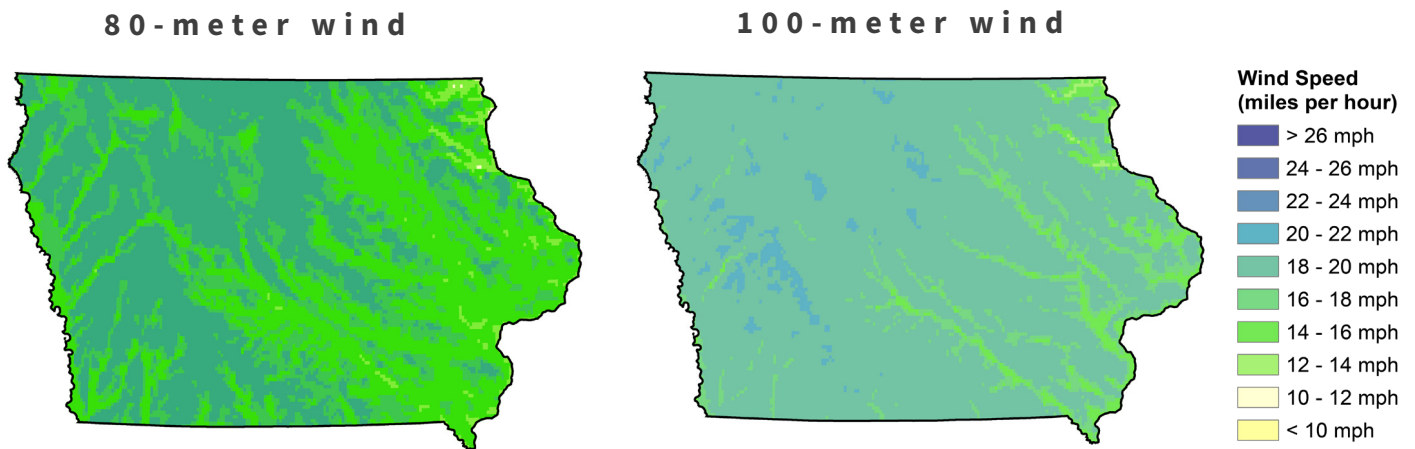
Equipment related to solar and wind development is exempt from sales tax, which does not affect local revenues. The state limits property taxes levied on both solar and wind projects, but at different rates and for different lengths of time (see more details on page 11). Property tax revenue from wind and solar projects is a major source of tax revenue for a number of counties in Iowa.

**Local governments benefit from solar and wind systems through tax revenue.**

# WIND AND SOLAR RESOURCES IN IOWA

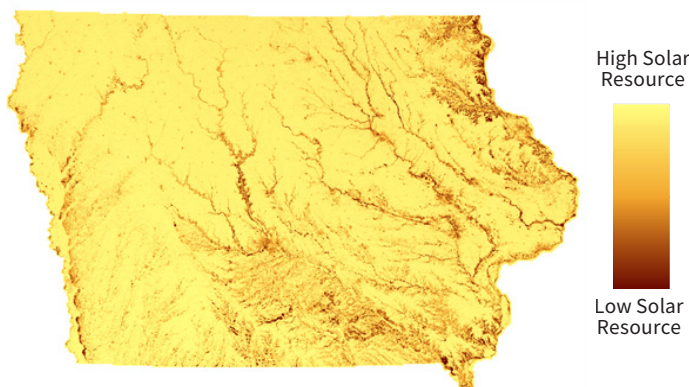
Iowa has abundant solar and wind resources. Figures 1 and 2 are a useful guide to identify regions with the best resource potential for renewable energy development. Local governments will need to consider more granular views of the data for assessing renewable energy development potential.

**Figure 1. Wind Resource**



Source: Adapted from National Renewable Energy Lab (NREL) national wind speed data, 2006-2013. NREL incorporates surface wind data, upper-air data, topography, and other factors to estimate the wind resource potential over an area of many square miles.

**Figure 2. Solar Resource**



Source: Adapted from Iowa Solar Asset Mapping Application and Database, University of Northern Iowa, 2015-16. Based on LiDAR data collected 2007-10.

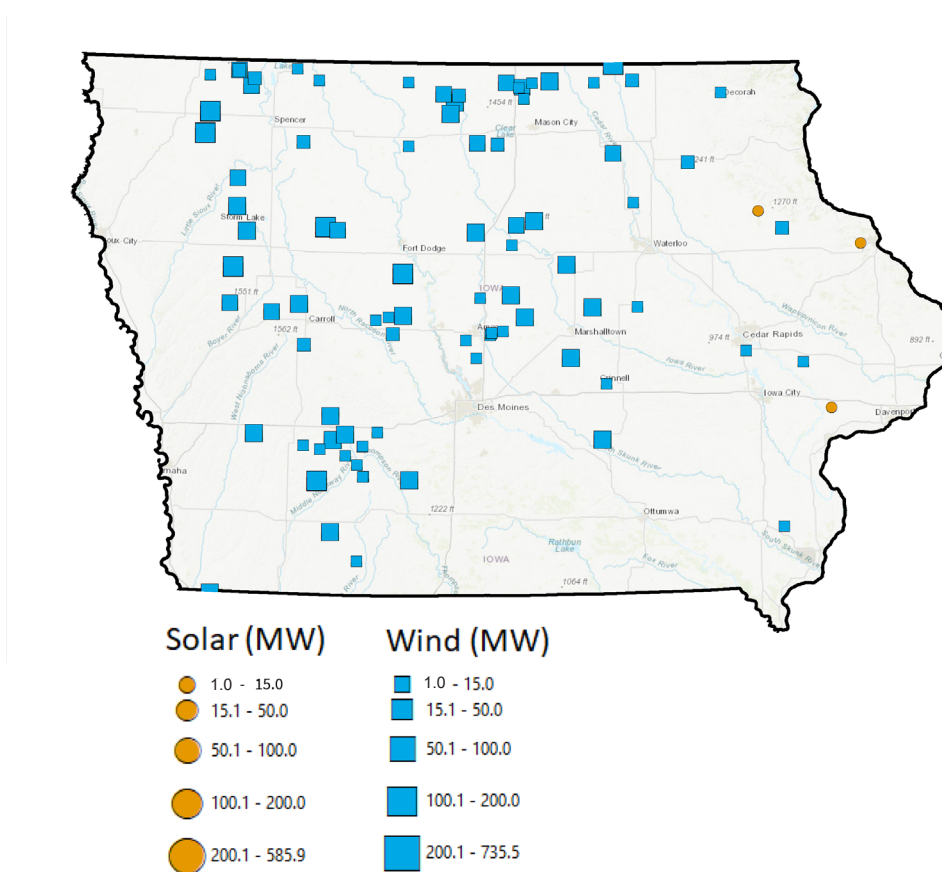
**Figure 1** shows the wind potential (in miles per hour) across Iowa for both 80 meters and 100 meters above the ground. Blue and green areas represent the best wind resource and yellow areas represent marginal or poor resources. The elevation shows the resource at the wind turbine tower height. Most new wind farms will have turbines at 100-meter hub height or greater. The data is most accurate for large spatial scales.<sup>1</sup>

**Figure 2** shows the solar potential across Iowa. Light yellow areas represent the highest solar resource and dark orange areas represent the lowest solar resource. The state measured solar resource data using LiDAR technology, which shows the amount of unshaded solar resource available throughout.<sup>2</sup>

# EXISTING WIND AND SOLAR PROJECTS

Iowa is one of the leading states in both renewable energy production and usage. While the state leads the country in percentage of electricity generated from wind energy,<sup>3</sup> solar generation currently represents less than one half of one percent of electricity sales.

**Figure 3. Existing Wind and Solar**

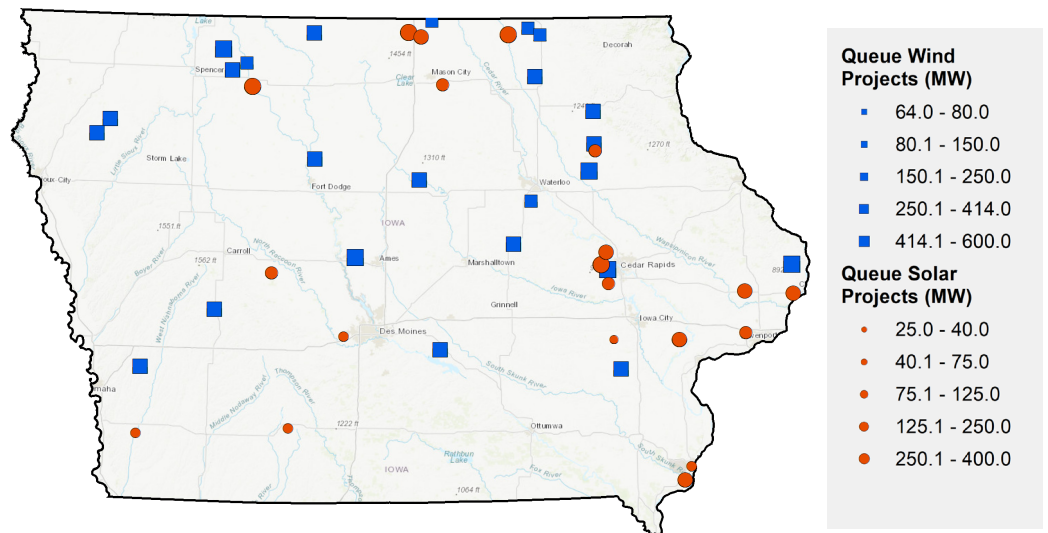


Source: Adapted from US Energy Information Administration (EIA) Generation Data (via Form 860) for wind and solar energy systems, updated through 2018. Map created January 2020.

**Figure 3** shows existing utility- and community-scale solar and wind energy projects in Iowa. The state had about 100 MW of solar capacity through 2018,<sup>4</sup> and approximately 8,965 MW of installed wind energy capacity in early 2019.<sup>5</sup>

# MARKET TRENDS IN WIND AND SOLAR

Figure 4. MISO Queue Projects



Source: Adapted from Midcontinent Independent System Operator (MISO) public interconnection queue dataset, accessed January 2020.

**Wind:** Wind energy deployment in Iowa is rapidly increasing. Approximately 1,667 MW are under construction in 2020 and several gigawatts (GW) are in the planning and investigation phase.<sup>6</sup>

**Solar:** The Midwest is an increasingly attractive location for wholesale (larger than 10 MW) solar market developments, which could significantly increase Iowa's total solar deployment over the next five to seven years. Approximately 270 MW are under construction in 2020 and with several individual large-scale projects currently in the planning and investigation phase.

**Figure 4** displays proposed solar and wind energy projects that have filed an application for interconnection with the Midcontinent Independent System Operator (MISO) as of January 2020. The MISO queue has 25 wind projects, comprising 4,822 MW of capacity, as of January 13, 2020.<sup>7</sup> As of that same date, 20 large-scale solar projects, with a generation capacity of 2,894 MW, are being pursued.<sup>8</sup> Projects that have reached this initial stage in the development process will not necessarily be constructed, but are an indicator of market activity and development interest.

# SOLAR ENERGY SITING AND POLICY

## RESOURCES FOR SITING AND DESIGN BEST PRACTICES



*Photo from National Renewable Energy Laboratory by Dennis Schroeder*

### State Solar Policy Summary

In 2013, the Iowa state legislature passed a suite of laws related to expanding solar energy in the state. These laws focus primarily on distributed generation solar, rather than utility-scale solar.

In 1983, Iowa passed the **Alternative Energy Production Law**, committing to renewable energy production by requiring the two largest utilities in the state to generate 105 MW from renewable energy sources.<sup>9</sup> The passage of this law marked the first state in the nation to adopt a renewable portfolio standard.<sup>10</sup> This goal has since been surpassed: as of 2019, Iowa has nearly 9,000 MW generating capacity from renewable resources (almost entirely from wind).<sup>11</sup>

### Existing Programs and Resources

The Iowa Local Government Solar Toolkit, developed and piloted in 2016 with five Iowa communities by GPI,

provides guidance on how to integrate both distributed and large-scale solar development into local plans and zoning ordinances.<sup>12</sup> The Iowa Environmental Council and the Center for Rural Affairs published the Iowa Solar Siting Resource Guide in 2020 that contains additional guidance for solar land use decision making.<sup>13</sup>

A number of Iowa communities are participating in another best practice program, the National SolSmart solar-ready certification program for local governments.<sup>14</sup> The SolSmart program offers additional models and guidance on land use and solar development, as well as free technical assistance to participating communities through 2020. Additional information is being developed on discrete siting or ordinance topics that are evolving as the solar industry grows, such as decommissioning considerations, waste disposal (solar panel replacement or wind turbine repowering), and integration of battery storage in large-scale projects.<sup>15</sup>

## Community Solar Programs

Iowa has no statewide community solar policy or program. However, individual utilities and third-party developers offer such programs.<sup>16</sup> In Iowa, community solar programs need different approval depending on their type. Cooperative and municipal utility programs need Board approval, but there is no state review. Investor owned utilities need state legislation or approval from the Iowa Utilities Board in order to create a program. Subscribers to community solar gardens must generally be within the utility service territory of the garden site.

*Photo from National Renewable Energy Laboratory by Dennis Schroeder*



## SITING AUTHORITY

All solar energy projects, regardless of size, are subject to local land use controls and must acquire zoning or development permits from the local government in which the project is located for those local governments that have zoning. Solar energy systems with a total capacity of 25 MW or more also require a generating certificate from the Iowa Utilities Board.<sup>17</sup> This generating certificate does not exempt these facilities from local land use controls.<sup>18</sup>



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# WIND ENERGY SITING AND POLICY

## RESOURCES FOR SITING AND DESIGN BEST PRACTICES

For a thorough guide to wind ordinance best practices in Iowa, see the Iowa Environmental Council's guide to [wind siting practices](#).<sup>19</sup>

### Wind Policy

Counties across Iowa have developed local ordinances regulating wind development, with some differences in standards, restrictions, and requirements.<sup>20</sup> Around half of Iowa's counties have utility-scale wind in operation or actively being developed, and a similar number have adopted a wind development ordinance.<sup>21</sup> Additional information is being developed for evolving issues or discrete siting or land use concerns, such as decommissioning and repowering considerations and integration of battery storage in large-scale projects.<sup>22</sup>

**Interconnection Process:** Distributed generation facilities less than 10 megawatts that are not subject to the interconnection requirements of the Federal Energy Regulatory Commission or the Midwest Independent Transmission System Operator (MISO) are subject to the Iowa interconnection standards. The level of review required for interconnection requests depends on the system capacity.<sup>23</sup>

**Small Wind Innovation Zone Program:** The Iowa Legislature created the Small Wind Innovation Zone Program, which allows any city, county, or any other political subdivision to create zones that promote small wind production. This program is for turbines with capacity of 100 kilowatts or less.<sup>24</sup> This program provides one tool for local governments to plan for wind development, but it is not applicable to utility-scale projects and therefore will not be covered in more detail in this guide.

## SITING AUTHORITY

### Large Utility-Scale Wind Energy Projects

**Authority:** Any electric power generating plant with a total capacity of 25 MW or more falls under the permitting authority of the Iowa Utilities Board (IUB) to receive a generating certificate.<sup>25</sup>

This generating certificate does not, however, exempt these facilities from local land use controls.<sup>26</sup> Wind energy projects must acquire zoning or development permits from the local governments in whose jurisdiction the projects are located. Not all jurisdictions have enacted zoning standards, and thus some projects need little more than IUB approval to proceed.



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**Permitting by the IUB:** The IUB will review the generation certificate application within 45 days from the date of the filing.<sup>27</sup> If the application is accepted, the project will proceed with a certification hearing no earlier than 90 days nor later than 150 days from the date of acceptance, conducted in the county of the proposed project with the board serving notice to interested parties.<sup>28</sup> An informational meeting will be held no less than 30 days prior to the filing of the generating certificate application in the county of the proposed project, wherein members of the public may raise questions to the applicant.<sup>29</sup>

**Public Comments:** For large, utility-scale facilities, community members may voice their opinions through two mechanisms:

- **Through the IUB:** The IUB grants the generating certificate for facilities. Public comment periods occur through the IUB, wherein individuals and groups may provide comments on large wind developments .

- **Through Local Zoning Hearings:** Zoning authority in Iowa occurs at the local level. Zoning approvals must include opportunities for community members to voice their support, concerns, questions, or interests at public hearings. A [guide](#) to local planning and zoning procedures may be found here.<sup>30</sup>

**Small Utility-Scale Wind Energy Projects:** Facilities less than 25 MW require only land use approvals from county or municipality jurisdictions (no certificate of need from the IUB is required).<sup>31</sup> Local land use and zoning standards for wind development vary widely by county. As noted above, local zoning approval for utility-scale projects include public hearings, wherein community members may participate in the decision-making process through voicing opposition, support, or other thoughts on the project.<sup>32</sup>

## Partial List of Iowa County Wind Ordinances

Many counties in Iowa have developed ordinances related to wind development. The Iowa Environmental Council has developed a guide that includes a review of 17 county ordinances in Iowa related to wind.<sup>33</sup> The counties in this study included Black Hawk, Boone, Cass, Clay, Carroll, Dickinson, Greene, Grundy, Ida, Kossuth, Madison, O’Brien, Osceola, Palo Alto, Pottawattamie, Poweshiek, Story, and Webster County.

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# TAXATION AND INCENTIVES

The Center for Rural Affairs has developed a [guide](#) describing Iowa's wind and solar property taxation laws and policies.<sup>34</sup>

## **Distribution of Revenues**

Typically, tax revenue goes to the county in which the facility is located, with the possibility of a portion of the amount going to the township where the system is located.

## **Property Tax**

*Solar:* The value added to a property by a solar energy system is exempt from property tax for five assessment years.<sup>35</sup>

*Wind:* Property taxes are assessed on wind generation facilities within the jurisdiction where the facilities are located. Property is assessed at 0 percent of the project value in a facility's first year of installation. The rate then increases by 5 percent with a cap of 30 percent of generation in the seventh year.

## **Sales Tax**

*Solar:* Equipment used to collect and convert solar radiation into energy is exempt from sales taxes in Iowa.<sup>36</sup>

*Wind:* Materials used to manufacture, install, or construct materials used to convert wind energy to electrical energy are exempt from sales tax in Iowa.<sup>37</sup>

# Endnotes

- 1** Draxl, Caroline, Andrew Clifton, Bri-Mathias Hodge, and Jim McCaa. “The wind integration national dataset (wind) toolkit.” National Renewable Energy Laboratory (2015).
- 2** University of Northern Iowa GeoInformatics Training, Research, Education, and Extension (GeoTREE) Center. Iowa Solar Asset Mapping. Published in 2016. Retrieved from the University of Northern Iowa.
- 3** “Reports detail Iowa’s continued lead in wind energy production,” Business Record (2018), <https://businessrecord.com/MobileContent/Energy-Environment/Energy-Environment/Article/Reports-detail-iowa-s-continued-lead-in-wind-energy-production-/183/930/83707>.
- 4** “Solar State by State” interactive data dashboard, Solar Energy Industries Association (SEIA), last updated 2019, accessed May 2019, <https://www.seia.org/states-map>.
- 5** DOE Office of Energy Efficiency & Renewable Energy WindExchange, “Wind Energy in Iowa,” accessed July 2019, <https://windexchange.energy.gov/states/ia>.
- 6** Generation Interconnection Queue,” Midcontinent Independent System Operator, accessed May 2019, [https://www.misoenergy.org/planning/generator-interconnection/GI\\_Queue/](https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/).
- 7** Generation Interconnection Queue,” Midcontinent Independent System Operator, accessed May 2019, [https://www.misoenergy.org/planning/generator-interconnection/GI\\_Queue/](https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/).
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- 9** “Alternative Energy Law,” NC Clean Energy Technology Center Database of State Incentives for Renewables & Efficiency, <https://programs.dsireusa.org/system/program/detail/265>.
- 10** “Iowa Profile Analysis,” US Energy Information Administration, <https://www.eia.gov/state/analysis.php?sid=IA>.
- 11** “Electric Power Monthly: Net Summer Capacity of Utility Scale Units by Technology and by State,” US Energy Information Administration, updated November 26 2019, [https://www.eia.gov/electricity/monthly/epm\\_table\\_grapher.php?t=epmt\\_6\\_02\\_a](https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_02_a).
- 12** “Iowa Local Government Solar Toolkit,” Grow Solar, <https://www.growsolar.org/wp-content/uploads/2012/06/Iowa-Toolkit-March2016.pdf>
- 13** Iowa Solar Siting Resource Guide,” Center for Rural Affairs and Iowa Environmental Council, [https://www.iaenvironment.org/webres/File/Solar%20Siting%20Guide%202\\_20\\_20.pdf](https://www.iaenvironment.org/webres/File/Solar%20Siting%20Guide%202_20_20.pdf)
- 14** “SolSmart Designation Program,” SolSmart, <https://www.solsmart.org>.
- 15** “Repowering and Decommissioning:What Happens in Communities When Solar and Wind Projects End?,” GreatPlains Institute, <https://www.betterenergy.org/blog/repowering-and-decommissioning-what-happens-in-communities-when-solar-and-wind-projects-end/>.
- 16** “Iowa,” National Renewable Energy Laboratory, <https://www.nrel.gov/solar/rps/ia.html>.
- 17** Iowa Code § 476A, subd.2.1.
- 18** “Successful County Wind Siting Practices in Iowa,” Iowa Environmental Council, Updated October 2019, [https://www.iaenvironment.org/webres/File/IEC\\_WindSiting\\_Best%20Practices\\_Oct\\_2019.pdf](https://www.iaenvironment.org/webres/File/IEC_WindSiting_Best%20Practices_Oct_2019.pdf).
- 19** “Successful County Wind Siting Practices in Iowa,” Iowa Environmental Council, Updated October 2019, [https://www.iaenvironment.org/webres/File/IEC\\_WindSiting\\_Best%20Practices\\_Oct\\_2019.pdf](https://www.iaenvironment.org/webres/File/IEC_WindSiting_Best%20Practices_Oct_2019.pdf).
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- 23** “Interconnection Standards,” NC Clean Energy Technology Center Database of State Incentives for Renewables & Efficiency, <http://programs.dsireusa.org/system/program/detail/946>.
- 24** “Small Wind Innovation Zone Program and Model Ordinance,” NC Clean Energy Technology Center Database of State Incentives for Renewables & Efficiency, <https://www.energy.gov/savings/small-wind-innovation-zone-program-and-model-ordinance>.
- 25** Iowa Code § 476A, subd.2.1

- 26** “Successful County Wind Siting Practices in Iowa,” Iowa Environmental Council, Updated October 2019, [https://www.iaenvironment.org/webres/File/IEC\\_WindSiting\\_Best%20Practices\\_Oct\\_2019.pdf](https://www.iaenvironment.org/webres/File/IEC_WindSiting_Best%20Practices_Oct_2019.pdf).
- 27** Iowa Admin. Code r. 199-24.5
- 28** Iowa Admin. Code r. 199-24.6
- 29** Iowa Admin. Code r. 199-24.7
- 30** “A Guide to Common Planning and Zoning Procedures,” Iowa State University Extension, <https://www.extension.iastate.edu/buchanan/sites/www.extension.iastate.edu/files/buchanan/zGuide.pdf>.
- 31** Iowa Code § 476A, subd.2.1
- 32** “A Guide to Common Planning and Zoning Procedures,” Iowa State University Extension, <https://www.extension.iastate.edu/buchanan/sites/www.extension.iastate.edu/files/buchanan/zGuide.pdf>.
- 33** “Successful County Wind Siting Practices in Iowa,” Iowa Environmental Council, updated October 2019, [https://www.iaenvironment.org/webres/File/IEC\\_WindSiting\\_Best%20Practices\\_Oct\\_2019.pdf](https://www.iaenvironment.org/webres/File/IEC_WindSiting_Best%20Practices_Oct_2019.pdf).
- 34** “Fact Sheet: Iowa Wind Energy Tax Revenue,” Center for Rural Affairs, <https://www.cfra.org/sites/www.cfra.org/files/publications/IA%20Wind%20Tax%20Revenue%20Fact%20Sheet.pdf>.
- 35** “Property Tax Exemption for Renewable Energy Systems,” NC Clean Energy Technology Center Database of State Incentives for Renewables & Efficiency, <http://programs.dsireusa.org/system/program/detail/184>.
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# ABOUT THE GREAT PLAINS INSTITUTE



## **GREAT PLAINS INSTITUTE**

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If you would like more information on resources available (and relevant) to your specific community, please reach out to:

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