

Expansion of Wind Energy in Iowa

OVERVIEW & OBJECTIVES

This lesson examines how site characteristics impact the location of wind turbines and wind farms across Iowa. It also examines how the expansion of wind energy in Iowa is changing the landscape over time and may, ultimately, impact communities and individuals. Students will propose and justify a site for a new wind turbine/wind farm after interacting with a variety of resources using the online WeExplore expedition.

Students will be able to...

- Summarize pros and cons of wind energy expansion.
- Describe patterns of wind turbine locations.
- Identify and justify a site for a new wind turbine/wind farm using geographic evidence.

GRADE

9th

TIME

2 Class Period

REQUIRED MATERIALS

- ✓ Computer Internet access for students

MINNESOTA SOCIAL STUDIES STANDARDS & BENCHMARKS

Standard 1. People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.

9.3.1.1.2 Apply geographic information from a variety of print and electronic sources to interpret the past and present and plan for the future; provide rationale for using specific technologies for each application.

Standard 2. Geographic Inquiry is a process in which people ask geographic questions and gather, organize and analyze information to solve problems and plan for the future.

9.3.1.2.1 Use geospatial technologies to make and justify decisions about the best location for facilities.

SUGGESTED PROCEDURE

Opening

Students complete one of two pre-assessments. Students create a “graffiti wall” to assess their prior knowledge about Iowa, wind energy, and pros and cons of wind energy. Another strategy is constructing an Anticipation Guide for students to predict whether statements will be found true or false through the WeExplore lesson. In addition, you may need to discuss terms such as, “sustainability,” “renewable/nonrenewable resource,” and “cultural landscape”.

Development

The entire lesson, “Expansion of Wind Energy in IA”, is located on WeExplore. Students move through the steps in the WeExplore Expedition and complete written work with each sequential portion of the expedition. At the conclusion of the lesson students will be able to explain:

- How has the expansion of wind energy in Iowa changed the landscape over time?
- Which site characteristics make for a good location for wind turbines/farms?

Closing

Students share their site selection and justification using one of the following strategies. Students do a gallery walk to view one another's site selections and justifications for a new wind turbine/farm in Iowa. With another strategy students put a sticker, mark, or pin at their location on a large outline map of Iowa on a white board or bulletin board and justify the location to the class. Students discuss their site selection and justification with a partner before discussing as a whole class. The last strategy asks you to create a Kahoot! review game to test students on what they understand about site selection and wind energy as a result of completing this lesson.

Assessment

- Paragraph identifying and justifying a location for a wind turbine/wind farm in Iowa

Website Resources

"Expansion of Wind Energy in IA" at WeExplore

<https://we-explore.com/expeditions/1752>

Kahoot!

<https://kahoot.it/#/>

WeExplore Website Resources

"Expansion of Wind Energy" Independence IA Photo at Alliant Energy Kids

<http://www.alliantenergykids.com/energyandtheenvironment/renewableenergy/022397>

"Iowa's Largest Turbine Project Under Construction" Video from KCCI News Channel at YouTube

<https://www.youtube.com/watch?v=LTPkCqW9ZXM>

"Wind Energy" Article at Storm Lake, Iowa

<http://www.stormlake.org/531/Wind-Energy>

"Iowa Wind Power" Video at National Geographic

<http://video.nationalgeographic.com/video/wind-power>

"States Buffeted by Turbulent Wind Industry" Article at PEW Charitable Trusts

<http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2013/06/04/states-buffeted-by-turbulent-wind-industry>

"Proposed Power Line Would Leave Imprint On Eastern Iowa" Video at KCRG News Source

<http://www.kcrg.com/subject/news/proposed-power-line-would-leave-imprint-on-eastern-iowa-20140713#media-well-container>

"Interactive: Growth of wind energy across Iowa" Interactive Map at WCF Courier

http://wfcourier.com/interactive-a-look-at-the-growth-of-wind-energy-across/html_1d635aea-59a8-11e1-b8b1-0019bb2963f4.html

"Areas of Concern for Wind Farm Sitings" Map at Iowa Department of Natural Resources

<http://www.iowadnr.gov/>

“Wind Energy and Wildlife Resource Management” Report at Iowa Department of Natural Resources
<http://www.iowadnr.gov>

“Estimated Average Annual Wind Speeds” Map at Iowa Energy Center
<http://www.iowaenergycentr.org/annual-wind-map>

“448 New Wind Turbines In Iowa Could Swing The 2016 Presidential Election” Article at Business Insider
<http://www.businessinsider.com/wind-energy-iowa-election-2014-1>

“Wind Farm” Map at USGS
<http://eerscmap.usgs.gov/windfarm/>

“Wind Program” Articles at Office of Energy Efficiency & Renewable Energy
<http://energy.gov/eere/wind/wind-program>

“Wind” Encyclopedia Entry at Institute for Energy Research
<http://instituteforenergyresearch.org/topics/encyclopedia/wind/>

“Wind Energy Facts at a Glance” Facts at American Wind Energy Association
<http://www.awea.org/Resources/Content.aspx?itemNumber=5059>

“Wind Energy Production Tax Credit and Renewable Energy Tax Credit” Report at Iowa Department of Revenue
<https://tax.iowa.gov/sites/files/idr/WEP%20and%20RE%20Tax%20Credit%20Evaluation%20Study.pdf>