

Wind Energy Guide for County Commissioners

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U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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Counties Care for America

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CONTENTS

Abstract

One of the key stakeholders associated with economic development are local government officials, who are often required to evaluate and vote on commercial wind energy project permits, as well as to determine and articulate what wind energy benefits accrue to their counties. Often these local officials lack experience with large-scale wind energy and need to make important decisions concerning what may be a complicated and controversial issue. These decisions can be confounded with diverse perspectives from various stakeholders. This project is designed to provide county commissioners, planners, and other local county government officials with a practical overview of information required to successfully implement commercial wind energy projects in their county. The guidebook provides readers with information on the following 13 topics: Brief Wind Energy Overview; Environmental Benefits; Wind Energy Myths and Facts; Economic Development Benefits; Wind Economics; The Development Process; Public Outreach; Siting Issues; Property Tax Incentives; Power System Impacts; Permitting, Zoning, and Siting Processes; Case Studies; and Further Information. For each of the above topics, the guidebook provides an introduction that identifies the topic, why local government should care, a topic snapshot, how the topic will arise, and a list of resources that define and assess the topic.

Introduction

Background

Wind Powering America (WPA) is a U.S. Department of Energy (DOE) program to dramatically increase the use of wind energy in the United States. WPA's mission is to increase rural economic development, protect the environment, and increase energy security by engaging in state-based activities, rural economic development activities, the greening of federal loads, and collaborations with utilities.

WPA has established economic development as one of its primary thematic areas. A key stakeholder associated with economic development is local government officials, who often must evaluate and vote on commercial wind energy project permits, as well as determine and articulate the wind energy benefits that accrue to their county. These local officials often lack experience with large-scale wind energy but may need to make important decisions concerning projects. These decisions can be confounded with diverse perspectives from various stakeholders.

WPA is committed to providing the various stakeholders with valuable, accurate, and current information on wind energy. The use of stakeholder-tailored guidebooks has proven useful in this commitment, and accordingly the development of this guidebook will address many salient topics encountered by local government officials throughout the commercial wind development process.

Project Objective

This project is designed to provide county commissioners, planners, and other local county government officials with a practical overview of information required to successfully implement commercial, utility-scale wind energy projects (600 kilowatts or larger) in their counties.[1]

This guidebook provides a concise and practical resource for local government officials as they follow the steps to large-scale wind energy development. The guidebook is divided into the following 13 topics:

1. Brief Wind Energy Overview
2. Environmental Benefits
3. Wind Energy Myths and Facts
4. Economic Development Benefits
5. Wind Economics
6. The Development Process
7. Public Outreach
8. Siting Issues
9. Property Tax Incentives
10. Power System Impacts
11. Permitting, Zoning, and Siting Processes
12. Case Studies
13. Further Information.

[1] County commissioners are also actively involved with siting small (10 kilowatts or less) and medium-size (10 to 250 kilowatts) wind projects. Cultivating small projects and community wind projects can help build public support for a county's commercial wind marketing efforts. Visit http://www.windpoweringamerica.gov/small_wind.asp for more information on projects of this size.

For each of the topics listed above, the guidebook provides an introduction that identifies the topic, why local government should care, an issue snapshot, how the topic will arise, and a list of resources that define and assess the topic. The following table layout is used for each topic.

Table Layout and Content Descriptions

<table>
<tr><td colspan="2">What Is It?</td><td>Concise summary of the topic</td></tr>
<tr><td colspan="2">Why Should I Care?</td><td>Indicates why the topic is important to local government officials</td></tr>
<tr><td colspan="2">Snapshot</td><td>Provides the reader with three to five key facts, recommendations, or opinions outlined in the guidebook's Essential Resource list
Snapshot #1
Snapshot #2
Snapshot #3</td></tr>
<tr><td colspan="2">When Will It Come Up?</td><td>From a local government official's point of view, the wind development process can be broken down into seven distinctive phases, known as the "7 P's":
Potential: Investigating the basics of wind energy, as well as establishing your county's wind resource
Promotion: Promoting your county's wind resources to your constituents and project developers
Public Outreach: Engaging the public on wind energy topics facing your county
Planning: Creating and implementing an effective county plan to facilitate wind energy development
Permitting: Creating and implementing effective permitting, zoning, and siting processes for wind energy projects within your county
Project Construction: Construction of the project takes place
Project O&M: Operations and maintenance (O&M) of the project takes place.
This section of the table will outline which of the 7 P's apply to the topic. (The Topic Matrix following this table summarizes all 13 topics and which of the 7 P's apply to each.)</td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>Provides a list of resources that capture the essence of each respective area. Resource title, location, brief summary</td></tr>
<tr><td>Further Reading</td><td>Provides a list of resources for additional investigation. These resources are typically available via the Internet. Resource title, location</td></tr>
</table>

Topic Matrix

Topic	*Description*	*Potential*	*Promotion*	*Outreach*	*Planning*	*Permitting*	*Construction*	*O&M*
Brief Wind Energy Overview	Overview of wind energy basics, including resource characteristics and technology	**X**	**X**	**X**				
Environmental Benefits	Documentation of the environmental benefits of wind power versus other electricity generation alternatives		**X**	**X**	**X**	**X**	**X**	**X**
Wind Energy Myths and Facts	Description of key wind energy myths and facts	**X**	**X**	**X**	**X**	**X**		
Economic Development Benefits	Quantifies the economic development benefits associated with wind energy projects	**X**	**X**	**X**	**X**		**X**	**X**
Wind Economics	General information about the economics of wind energy versus other generation sources	**X**	**X**	**X**	**X**			
The Development Process	Discussion of the typical commercial wind project development steps			**X**	**X**	**X**	**X**	**X**
Public Outreach	Methods of facilitating public outreach with your constituents		**X**	**X**	**X**	**X**	**X**	**X**
Siting Issues	Overview of common siting impacts typically associated with wind projects		**X**	**X**	**X**	**X**	**X**	**X**
Property Tax Incentives	Discussion of what type of tax incentives are used in commercial wind projects, as well as how to effectively structure such incentives			**X**	**X**	**X**	**X**	**X**
Power System Impacts	Brief discussion of how wind projects are integrated into the power system, including integration with existing and future generation and the transmission grid			**X**	**X**	**X**	**X**	**X**
Permitting, Zoning, and Siting Processes	Strategies for developing effective commercial wind energy permitting processes and zoning ordinances			**X**	**X**	**X**	**X**	**X**
Case Studies	Description of successful wind project case studies		**X**	**X**				
Further Information	Additional information on topics not included in the guidebook		**X**	**X**				

Brief Wind Energy Overview

<table>
<tr><td>What Is It?</td><td colspan="2">Overview of wind energy basics, including resource characteristics and technology</td></tr>
<tr><td>Why Should I Care?</td><td colspan="2">A solid understanding of what wind energy is and how it works will enable you to better communicate with project stakeholders and to make better decisions in the public interest.</td></tr>
<tr><td>Snapshot</td><td colspan="2">• The United States has installed greater than 10,000 MW of wind energy to date.
• U.S. wind resources could meet 20% of the U.S. electricity demand.
• Today's commercial wind turbines are typically 150'to 300' tall, produce enough energy for 300 to 600 typical U.S. households per turbine, and are down for maintenance less than 2% of the time.</td></tr>
<tr><td>When Will It Come Up?</td><td colspan="2">
<table>
<tr><th>Potential</th><th>Promotion</th><th>Public Outreach</th><th>Planning</th><th>Permitting</th><th>Project Construction</th><th>Project O&M</th></tr>
<tr><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>"Wind Web Tutorial," American Wind Energy Association Web site, http://www.awea.org/faq/index.html. A place to start learning about wind energy's basic features, costs, potential, operating impacts, environmental impacts, statistics, and policy.

"Guided Tour on Wind Energy," Danish Wind Energy Association Web site, http://www.windpower.org/composite-85.htm. Each one of the chapters in the guided tour is a self-contained unit. Topics include turbine siting, energy output, generators, turbine design, manufacturing, and the history of wind energy. The tour is available in a number of languages.

"Introduction to Wind Energy," Windustry, http://www.windustry.org/basics/03-introductiontowind.htm. Discusses wind's basic information and provides a portal to learning more about wind. Topics include turbine sizes, industry growth rates, environmental impacts, advantages/disadvantages of wind, and landowner guides.

"How Wind Turbines Work," U.S. Department of Energy's Wind and Hydropower Technologies Program, http://www1.eere.energy.gov/windandhydro/wind_how.html. Learn how wind turbines work, as well as how wind turbine sizes and designs differ.</td></tr>
<tr><td>Further Reading</td><td>"Wind Energy for Electric Power," Renewable Energy Policy Project, http://www.repp.org/articles/static/1/binaries/wind%20issue%20brief_FINAL.pdf

"Wind Energy Potential in the United States," National Renewable Energy Laboratory, http://www.nrel.gov/wind/wind_potential.html

"State Wind Resource Maps," Wind Powering America, http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_maps.asp

"Wind Resource Resources," Windustry, http://www.windustry.org/resources/windmaps.htm</td></tr>
</table>

Environmental Benefits

<table>
<tr><td>What Is It?</td><td>Documentation of the environmental benefits of wind power versus other electricity generation alternatives</td></tr>
<tr><td>Why Should I Care?</td><td>Power plant air emissions are responsible for approximately one-third of nitrogen oxide emissions, two-thirds of sulfur dioxide emissions, and one-third of carbon dioxide emissions nationally. Wind energy can avoid or reduce these air emissions, as well as reduce water consumption, thermal pollution, waste, noise, and adverse land-use impacts. Understanding wind energy's environmental benefits will enable you to better communicate with interested stakeholders.</td></tr>
<tr><td>Snapshot</td><td>Wind energy offers:
No air emissions
No fuel to mine, transport, or store
No water required for cooling (unlike conventional power plants)
No water pollution
No mercury emissions.
A 1997 study ("Comparative Air Emissions of Wind and Other Generating Fuels" by the American Wind Energy Association) showed the following fuel types annually emitted the following quantities of carbon dioxide:
Coal: 3,807 billion lbs
Natural gas: 291 billion lbs
Oil: 122 billion lbs
Wind: 0 billion lbs.</td></tr>
<tr><td>When Will It Come Up?</td><td>
<table>
<tr><th>Potential</th><th>Promotion</th><th>Public Outreach</th><th>Planning</th><th>Permitting</th><th>Project Construction</th><th>Project O&M</th></tr>
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</table>
</td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>"Comparative Air Emissions of Wind and Other Generating Fuels," American Wind Energy Association, http://www.awea.org/pubs/factsheets/EmissionKB.PDF. Quantifies wind energy's environmental impacts to that of other electricity generation sources. A single 750-kW wind turbine, operated for 1 year at a Class 4 wind site, can be expected to displace 2.7M lbs of CO2, 14,000 lbs of SO2, and 8,700 lbs of NO2.

"Environmental Benefits of Renewable Energy," Union of Concerned Scientists, http://www.ucsusa.org/clean_energy/renewable_energy_basics/environmental-benefits-of-renewable-energy.html. A 1995 Intergovernmental Panel on Climate Change concluded that global temperatures have risen and that human activities are having a discernable effect on the climate system. Wind energy can be a key component of mitigating the climate change risks and represents virtually no net carbon emissions.</td></tr>
<tr><td>Further Reading</td><td>"Coal vs. Wind Power: You be the Judge," Union of Concerned Scientists, http://www.ucsusa.org/clean_energy/renewable_energy_basics/coal-vs-wind-power-you-be-the-judge.html

"Comparative Impacts of Wind and Other Energy Sources on Wildlife," American Wind Energy Association, http://www.awea.org/pubs/factsheets/wildlife.pdf</td></tr>
</table>

Wind Energy Myths and Facts

<table>
<tr><td>What Is It?</td><td colspan="2">Description of key wind energy myths and facts</td></tr>
<tr><td>Why Should I Care?</td><td colspan="2">Local government officials are typically an information source for a variety of stakeholders. This section provides you with accurate information to distribute to your stakeholders and to use for internal decision-making.</td></tr>
<tr><td>Snapshot</td><td colspan="2">• An operating modern wind farm at a distance of 750’-1,000’ is no louder than a kitchen refrigerator or moderately quiet room.
• Wind projects and wildlife can and do coexist successfully.
• Like all energy sources, wind energy receives federal and, in some cases, state subsidies. It would be unfair to expect wind energy to compete in the marketplace without the incentives enjoyed by traditional energy production methods.
• Wind energy does not require one-to-one generation backup as it is considered primarily an energy resource.</td></tr>
<tr><td>When Will It Come Up?</td><td colspan="2"><table><tr><th>Potential</th><th>Promotion</th><th>Public Outreach</th><th>Planning</th><th>Permitting</th><th>Project Construction</th><th>Project O&M</th></tr><tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td></td></tr></table></td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>“Wind Power Myths vs. Facts,” American Wind Energy Association, http://www.awea.org/pubs/factsheets/050629_Myths_vs_Facts_Fact_Sheet.pdf. As wind power generates more electricity in the United States and moves into new areas of the country, more people are introduced to wind turbines in their communities. Wind power is still a relatively new technology and a number of myths—some based on old technologies, some based on misunderstandings—are often repeated. This document uses facts from 25 years of utility experience to dispel some of the most common wind power myths. Topics include noise, turbine lighting, shadow flicker, communication signal interference, property values, tourism, tax base, safety, tower failure, blade throws, wildlife impact, reliability, cost, availability, inefficiency, and subsidization.

“Wind Energy Myths,” Wind Powering America, http://www.nrel.gov/docs/fy05osti/37657.pdf. Discusses the 10 most common wind energy myths. Topics include cost, federal tax incentives, local economic benefits, back-up generation, rate increases, system upgrades, power quality, small projects, birds, and noise.</td></tr>
<tr><td>Further Reading</td><td>“If not wind… then what?”, American Wind Energy Association, http://www.ifnotwind.org/default.shtml

“Update of Avian and Bat Studies from Windpower Studies,” Western EcoSystems Technology Inc., http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/workshops/2006_summit/kerns.pdf

“Economic Impacts of Wind Power in Kittitas County,” ECONorthwest, http://www.catenergy.com/pdf%20files/Kittitas%20Wind%20final.pdf</td></tr>
</table>

Economic Development Benefits

<table>
<tr><td>What Is It?</td><td colspan="2">Quantifies the economic development benefits associated with wind energy projects</td></tr>
<tr><td>Why Should I Care?</td><td colspan="2">Wind energy projects are proven economic development drivers in the areas where they are sited. This section will qualify and quantify the economic development benefits that can be expected.</td></tr>
<tr><td>Snapshot</td><td colspan="2">• The main economic development benefits associated with wind projects are job creation, local project spending, annual property and sales taxes, and annual landowner easement payments.
• Forty to 140 jobs are created during the construction phase for every 100 MW of installed capacity; 6 to 10 new jobs are created during the operations phase for every 100 MW of installed capacity.
• $500,000-$1,000,000 in new annual property tax payments are generated for every 100 MW of installed capacity.
• Annual landowner easement payments are typically $2,000-$5,000 per MW of installed capacity.</td></tr>
<tr><td>When Will It Come Up?</td><td colspan="2"><table><tr><th>Potential</th><th>Promotion</th><th>Public Outreach</th><th>Planning</th><th>Permitting</th><th>Project Construction</th><th>Project O&M</th></tr><tr><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr></table></td></tr>
<tr><td>Resource Lists</td><td>Essential</td><td>“Wind Energy for Rural Economic Development,” Wind Powering America, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/flowers_windpower_2005.pdf. PowerPoint presentation that discusses economic development basics, economic security, challenges, relationship with rural areas, and specific impacts, including job creation, property taxes, and landowner revenues. Several case studies portray the real impacts wind projects have had on local communities.

“Job and Economic Development Impact (JEDI) Model,” National Renewable Energy Laboratory, http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=707. The JEDI Model is an easy-to-use tool that analyzes the economic impacts of constructing and operating wind power plants. Users enter basic project information to determine the project cost and the income, economic activity, and number of jobs that will accrue to the state or local region. Using project-specific data and an accurate estimate of the share of spending that is expected to occur locally will result in a more accurate analysis of the localized impact.</td></tr>
</table>

Economic Development Benefits, cont.

Resource Lists	*Further Reading*	"Comparing Statewide Economic Impacts of New Generation of Wind, Coal, and Natural Gas in Arizona, Colorado, and Michigan," National Renewable Energy Laboratory, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/38154_econdev_compare_statewide.pdf "Assessing the Economic Development Impacts of Wind Power," National Wind Coordinating Committee, http://nationalwind.org/publications/economic/econ_final_report.pdf "Quantifying the Economic Development Impacts of Wind Power in Six Rural Montana Counties Using NREL's JEDI Model," National Renewable Energy Laboratory, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/36414_jedi_montana.pdf "Tax and Landowner Revenue from Wind Projects," National Conference for State Legislators, http://egov.oregon.gov/ENERGY/RENEW/Wind/docs/Windlandownerrevenueslegisbrief.pdf "What Landowners Should Know," Wind Powering America, http://www.windpoweringamerica.gov/docs/what_landowners_should_know.doc "Economic Development Impacts of Wind Power—Summary of Case Study Results," National Wind Coordinating Committee, http://nationalwind.org/publications/economic/casestudy_summary.pdf "Analysis: Economic Impacts of Wind Applications in Rural Counties," National Renewable Energy Laboratory, http://www.nrel.gov/docs/fy06osti/39099.pdf

Wind Economics

<table>
<tr><td>What Is It?</td><td colspan="2">General information about the economics of wind energy versus other generation sources</td></tr>
<tr><td>Why Should I Care?</td><td colspan="2">Understanding the production costs of wind energy and other energy types will enable you to provide accurate information to your stakeholders.</td></tr>
<tr><td>Snapshot</td><td colspan="2">• Other energy generation types typically have an input fuel cost, whereas wind energy does not.
• Conventional electricity generation options (excludes renewable sources) are often not required to directly account for the societal costs of their environmental impacts.
• Wind energy's delivered cost has fallen 90% in the past 25 years and is now competitive with other new generation sources (contract prices are typically 4-6 cents per kWh).
• Wind energy's economics are largely a function of the project's size, wind resource, policy incentives, and financing.</td></tr>
<tr><td>When Will It Come Up?</td><td colspan="2">
<table>
<tr><th>Potential</th><th>Promotion</th><th>Public Outreach</th><th>Planning</th><th>Permitting</th><th>Project Construction</th><th>Project O&M</th></tr>
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</table>
</td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>"The Economics of Wind Energy," American Wind Energy Association, http://www.awea.org/pubs/factsheets/EconomicsofWind-March2002.pdf. The economics of wind energy have changed dramatically over the past 20 years, as the cost of wind power has fallen ~90% during that period. Despite that progress, the wind industry is still maturing, with production volumes increasing steadily. Thus, the factors affecting the cost of wind energy are still changing, and wind energy's costs are expected to continue to decline as the industry grows and matures. Several topics are discussed: cost and wind speed, improvements in turbine design, economies of scale, optimal configuration of turbines, cost of financing, energy policy, and ancillary economic benefits.

"How Does Wind Compare to the Cost of Other Electricity Generation Options?", Wind Powering America, http://www.eere.energy.gov/windandhydro/windpoweringamerica/ne_economics_compare.asp. In terms of direct costs, larger wind farms in windier areas are considered to be economically competitive with new, conventional fossil fuel power plants. But to compare the costs of wind power to other types of electricity generation on an apples-to-apples basis, it is critical to consider both direct and indirect costs. Indirect costs are those that are imposed on society as a whole that are not paid for by generators and therefore are not reflected in the direct costs of electricity. In comparing the total costs of wind power with the costs of other alternatives, the costs of air, water, and land pollution, as well as fuel extraction, supply lines, and military intervention to ensure supply must be considered.</td></tr>
</table>

Wind Economics, cont.

Resource Lists	*Further Reading*	"Wind Energy Economics," Windustry, http://www.windustry.org/basics/07-economics.htm "What are the factors in the cost of electricity from wind turbines?", AWEA, http://www.awea.org/faq/cost.html "Wind Energy for Electric Power—A REPP Issue Brief," Renewable Energy Policy Project, http://www.repp.org/articles/static/1/binaries/wind%20issue%20brief_FINAL.pdf "Colorado Public Utility Commission's Xcel Wind Decision," National Renewable Energy Laboratory, http://www.nrel.gov/docs/fy01osti/30551.pdf "Federal Energy Subsidies—Not all Technologies are Created Equal," Renewable Energy Policy Project, http://www.crest.org/repp_pubs/pdf/subsidies.pdf "The Economics of Wind Energy," Clipper Wind, http://www.windpoweringamerica.gov/pdfs/workshops/2006_summit/vaughan.pdf

The Development Process

<table>
<tr><td>What Is It?</td><td colspan="2">Discussion of the typical commercial wind project development steps</td></tr>
<tr><td>Why Should I Care?</td><td colspan="2">This section will help you to better understand the specific development steps required during the course of planning, engineering, and constructing utility-scale wind projects.</td></tr>
<tr><td>Snapshot</td><td colspan="2">The 12 development steps for commercial wind projects are site selection, land agreements, wind assessment, environmental review, economic modeling, interconnection studies, permitting, sales agreement, financing, turbine procurement, construction contracting, and operations and maintenance.</td></tr>
<tr><td>When Will It Come Up?</td><td colspan="2">
<table>
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<tr><td></td><td></td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
</table>
</td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>“The Wind Project Development Process,” Distributed Generation Systems, Inc., http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wind_development_process.pdf. Overview of the specific steps and sub-steps that are required to plan, design, construct, and operate a typical wind project.

“10 Steps in Building a Wind Farm,” American Wind Energy Association, http://www.awea.org/pubs/factsheets/10stwf_fs.PDF. An AWEA fact sheet that discusses the 10 steps to building a wind farm. The steps include understanding your wind resource, determining proximity to existing transmission lines, securing access to land, establishing access to capital, identifying reliable power purchaser or market, addressing siting and project feasibility considerations, understanding wind energy’s economics, obtaining zoning and permitting expertise, establishing dialogue with turbine manufacturers and project developers, and securing agreement to meet O&M needs.</td></tr>
<tr><td>Further Reading</td><td>“Guidebooks to Wind Energy Development,” Windustry, http://www.windustry.org/resources/guidebooks.htm

“Wind Energy Easements: A Guide for Rural Land Owners,” Windustry, http://www.windustry.org/easements/default.htm

“Property Taxation of Wind Energy Assets,” Windustry, http://www.windustry.org/resources/tax.htm

“Community Wind: An Oregon Guidebook,” Northwest Sustainable Energy for Economic Development, http://www.nwseed.org/publications/Guidebook/oregon_wind_guidebook.pdf</td></tr>
</table>

Public Outreach

What Is It?	Methods of facilitating public outreach with your constituents
Why Should I Care?	As a local government official, communication during the development and operation of any project is critical. This section will provide you with effective strategies for communicating with project stakeholders during the planning, construction, and operation phases.
Snapshot	• Public involvement is always worthwhile and public workshops are crucial. • Listen carefully to community concerns and gather information as needed. • Effective messages contain three key topics: • Begin with the most important item first. • Talk in 30-second sound bites. • Avoid reading a script. • Be prompt when following up with media requests for information.
When Will It Come Up?	

Potential	*Promotion*	*Public Outreach*	*Planning*	*Permitting*	*Project Construction*	*Project O&M*
	X	**X**	**X**	**X**	**X**	**X**

Resource Lists	*Essential*	"Working with the Farm Broadcasters and the Broadcast Media," Michelle Rook, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/workshops/2005_summit/rook.pdf. Presentation at the 2005 WPA State Summit that discusses general rules for working with broadcasters and reporters, how farm broadcasters differ from mainstream reporters, and tips for packaging your message. Rook also covers characteristics of good interviews and tips for handling tough interviews. "Wind Power Facility Siting Case Studies: Community Response," National Wind Coordinating Committee, http://nationalwind.org/publications/siting/Wind_Power_Facility_Siting_Case_Studies.pdf. The NWCC Siting Workgroup studied communities' reactions to local wind development projects, with the intent of identifying circumstances that distinguish welcomed projects from projects that were resisted by the communities. The NWCC Siting Workgroup was also interested in examining the changes in community perceptions before, during, and after project construction, as well as recognizing what wind project developers can do to address the common concerns that often occur at wind project sites. Case studies are presented from southwestern Minnesota, central New York, and south central/western Oklahoma. The interviews and background research identified many aspects of a successful partnership among wind developers, local communities, governments, and other concerned parties. The following approaches were used by developers to successfully deal with community concerns: listen carefully to community concerns, educate the public, communicate early and often, and remain open to unorthodox solutions.
	Further Reading	"Permitting of Wind Energy Facilities—a Handbook," National Wind Coordinating Committee, http://nationalwind.org/publications/siting/permitting2002.pdf "Sample Introductory Letter to Neighbors," American Wind Energy Association, http://www.awea.org/smallwind/toolbox/SAMPLE_LETTERS/default.asp

Siting Issues

What Is It?	Overview of common siting issues typically associated with wind projects
Why Should I Care?	Siting issues typically draw intense public scrutiny. This section provides accurate information and analysis of the most common wind energy siting issues.
Snapshot	• The large majority of wind energy siting issues can be mitigated via effective public communication by directly addressing pertinent siting issues raised by the public and implementing effective siting guidelines. • The following estimated annual avian collision mortalities occur in the United States: • Vehicles: 60 – 80 million • Buildings/windows: 98 – 980 million • Transmission lines: 174 million • Communication towers: 4 – 50 million • Wind turbines: 0.01 – 0.04 million • Research shows that wind projects do not have detrimental effects on tourism or property values and that turbine noise is minimal.
When Will It Come Up?	

Potential	*Promotion*	*Public Outreach*	*Planning*	*Permitting*	*Project Construction*	*Project O&M*
	X	X	X	X	X	X

Resource Lists — *Essential*

"The Effects of Wind Development on Local Property Values," Renewable Energy Policy Project http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf. The report reviews data on property sales in the vicinity of wind projects and uses statistical analysis to determine whether and the extent to which the presence of a wind power project has influenced property prices. The hypothesis underlying this analysis is that if wind development can reasonably be claimed to hurt property values, then a careful review of the sales data should show a negative effect on property values with the viewshed of the projects. The results suggest that there is no support for the claim that wind development will harm property values.

"Facts About Wind Energy and Noise," American Wind Energy Association, http://www.awea.org/pubs/factsheets/WE_Noise.pdf. The fact sheet discusses noise, the types of noise produced by wind turbines and wind farms, and how manufacturers reduce wind turbine noise. Additionally, a brief discussion on how to reduce the likelihood of a noise problem from a wind project is included.

"Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons of Avian Collision Mortality in the United States," National Wind Coordinating Committee, http://www.nationalwind.org/publications/wildlife/avian_collisions.pdf. Reports the estimated number of avian collision mortality in the United States, typical causes of avian mortality, and risks to avian populations from wind projects. Based on current estimates, avian fatalities related to wind farms represent from 0.01% to 0.02% (i.e., 1 out of every 5,000 to 10,000 avian fatalities) of the annual avian collision fatalities in the United States.

Siting Issues, cont.

Resource Lists	*Further Reading*	
		"Wind Radar Interference," Idaho National Laboratory, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/workshops/2006_summit/seifert.pdf "Tourist Attitudes Towards Wind Farms," British Wind Energy Association, http://www.bwea.com/pdf/MORI.pdf "Aesthetic Issues and Residential Wind Turbines," American Wind Energy Association, http://www.awea.org/faq/sagrillo/ms_aesthetics_0405.html

Property Tax Incentives

What Is It?	Discussion of what type of tax incentives are used in commercial wind projects, as well as how to effectively structure such incentives.
Why Should I Care?	Provides you with the methods, structures, and philosophy of local wind energy taxation. This section also briefly outlines what property/sales taxes do/fail to do.
Snapshot	• Property tax incentives are structured as exemptions, exclusions, or credits. • To date, 26 states have property tax incentives in place for wind projects, with the large majority of property taxes collected locally. • What property tax incentives do well: • Help with wind energy's high capital recovery costs • Bring wind development to areas with less robust wind resources • Offer an excellent negotiation item to developers. • What property tax incentives fail to do well: • Impact the value of the project's tax revenue to the local economy. • Some tax incentive options: • A property tax incentive that is phased in during the project's early years, when it is most needed, and then phased out, appears to provide the greatest benefit to wind developers. • County governments should consider the structure and magnitude of property tax incentives in nearby counties and states. • If your local government has not been given taxing authority over local wind projects by state law, consider developing a payment-in-lieu-of-taxes (PILT) system that will replace the lost tax revenue.
When Will It Come Up?	

Potential	*Promotion*	*Public Outreach*	*Planning*	*Permitting*	*Project Construction*	*Project O&M*
		X	**X**	**X**	**X**	**X**

Resource Lists	*Essential*	"Property Tax Incentives," National Conference of State Legislators, http://www.ncsl.org/programs/energy/propertytaxFS.htm. Discusses typical property tax structures (exemptions, exclusions, and credits), how taxes are collected, and which states have adopted some form of property tax incentive. The site also discusses what property taxes do well and fail to do well, as well as what they typically cost. "Tax Incentives," U.S. Department of Energy, http://www.eere.energy.gov/states/alternatives/tax_incentives.cfm. Tax incentive programs to encourage renewable energy are designed to facilitate the purchase, installation, or manufacture of renewable energy systems, equipment, and facilities. The goal of these programs is to reduce the investment costs of acquiring and installing these systems. The site discusses the various types of incentives, as well as arguments for and against tax incentives. "Property Taxation of Wind Energy Assets," Windustry, http://www.windustry.org/resources/tax.htm. A summary of the actual and potential local economic benefits of wind power, including a survey of the varieties of approaches throughout the United States to property tax treatment of wind energy generation facilities.

Property Tax Incentives, cont.

Resource Lists	*Further Reading*	"Taxing Wind Energy in Minnesota," Institute for Local Self-Reliance, http://www.me3.org/issues/wind/windtax.pdf "NYSERDA Community Resources for Wind Development," New York State Energy Research and Development Authority, http://www.powernaturally.org/Programs/Wind/toolkit.asp "Database of State Incentives for Renewable Energy (DSIRE)," http://www.dsireusa.org/index.cfm?EE=0&RE=1

Power System Impacts

What Is It?	Brief discussion of how wind projects are integrated into the power system, including integration with existing and future generation and the transmission grid
Why Should I Care?	Integrating wind energy with existing transmission and generation systems is a complex technical and procedural topic. This section provides you with the necessary information to discuss the topic with project stakeholders.
Snapshot	• In areas with limited penetration (less than 10%), system stabilities studies have shown that modern wind plants can be added without degrading system performance (and in many cases they increase system performance). • Utility planners traditionally view new generation primarily in terms of its capacity to serve peak demand. However, wind is primarily an energy resource, meaning that its value lies in its ability to displace more expensive energy and to serve as a hedge against future fuel price and emission risks. • The addition of a wind plant to a power system does not require the addition of a one-to-one backup, as wind is used primarily as an energy resource. • Functioning hour-ahead and day-ahead markets provide the best means of addressing wind plant variability, and few operating impacts occur when wind represents less than 15% of the system capacity. • Wind energy's variability is not a critical transmission integration issue, and many transmission service providers have adopted effective procedures for integrating wind energy into their existing transmission systems at operating impact costs of less than 0.5 cents per kWh. Currently, wheeling fees, imbalance penalties, and capacity valuations are control-area specific.
When Will It Come Up?	

Potential	*Promotion*	*Public Outreach*	*Planning*	*Permitting*	*Project Construction*	*Project O&M*
		X	**X**	**X**	**X**	**X**

Resource Lists	*Essential*	"Utility Wind Integration State of the Art," Utility Wind Integration Group, http://www.uwig.org/UWIGWindIntegration052006.pdf. Study summary showing system impact costs attributed to incorporating significant wind generation into the power system. Topics include interconnection, integration, transmission planning and market operation, and accommodating more wind in the future. Study performed in conjunction with Institute of Electrical and Electronic Engineers and the Power Engineering Society. "Distributed Wind Generation Study for Northeast Colorado," Colorado Governor's Office of Energy Management and Wind Powering America, http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=1099. The purpose of the study was to determine the ability to interconnect large wind turbines to a typical distribution system in northeastern Colorado. The Highline Electric Association's (HEA) distribution grid was used for the study, and the HEA provided the design and operating data on its electric system. Three scenarios were evaluated using the existing distribution system and were found to be practical if the amount of wind generation added was in the range of one to five wind turbines at a particular location or area, within 5 miles of an existing substation.

Power System Impacts, cont.

Resource Lists	*Further Reading*	"Wind Power Impacts on System Operation: A Summary of Results," Utility Wind Interest Group, https://www.nationalwind.org/events/business/31/presentations/smith.pdf "Utility Integration of Wind Power," Renewable Northwest Project, http://www.rnp.org/Resources/WindIntegration.html "Wind Energy Interconnection," National Wind Coordinating Committee, http://nationalwind.org/publications/transmission/transbriefs/Interconnection.pdf "Fair Transmission Access for Wind: A Brief Discussion of Priority Issues," American Wind Energy Association, http://www.awea.org/policy/documents/transmission.PDF "Analyses of Wind Energy Impact on WFEC System Operations," National Renewable Energy Laboratory, http://www.nrel.gov/docs/fy05osti/37851.pdf "The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations," New York State Energy Research and Developmental Authority, http://www.nyserda.org/publications/wind_integration_report.pdf

Permitting, Zoning, and Siting Processes

What Is It?	Strategies for developing effective commercial wind energy permitting processes and zoning ordinances
Why Should I Care?	It is critical for local government officials to have effective permitting, zoning, and siting processes in place prior to moving forward with large-scale wind energy development. This section outlines the proven strategies and methods of establishing these three critical processes.
Snapshot	Eight elements have been identified for commercial wind development that include effective agency review, meaningful public involvement, and timely and defensible decisions: • Significant public involvement • Issue-oriented process • Clear decision criteria • Coordinating permitting process • Reasonable time frames • Advance planning • Efficient administrative and judicial review • Active compliance monitoring. The above guidelines often seek to address land use, noise, avian, aesthetics, soil erosion, water quality, public health and safety, cultural and paleontological resources, socioeconomic/pubic services/infrastructure, solid and hazardous waste, and air quality/climate considerations with large wind farms. The following sections also discuss: • Information resources for county planners • Issues to consider while drafting effective zoning ordinances • An example of a successful permitting process • An example of an effective state wind energy permitting policy • Listing of counties that have developed actual zoning ordinances.
When Will It Come Up?	

Potential	*Promotion*	*Public Outreach*	*Planning*	*Permitting*	*Project Construction*	*Project O&M*
		X	**X**	**X**	**X**	**X**

Permitting, Zoning, and Siting Processes, cont.

Resource Lists	*Essential*	"Permitting of Wind Energy Facilities—a Handbook," National Wind Coordinating Committee, http://nationalwind.org/publications/siting/permitting2002.pdf. This document is the source for effective methods and strategies for permitting wind projects. The handbook is written for individuals and groups involved in evaluating wind projects, including decision-makers and agency staff at all levels of government, wind developers, interested parties, and the public. Its purpose it to assist stakeholders to be informed participates in the wind energy development decision-making process. Topics include an overview of wind development and permitting, guidelines for structuring the wind farm permitting process, specific permitting considerations and strategies, and case studies. "Planning and Zoning for Wind Power Facilities," American Planning Association Zoning News February 2003 article. A great resource for local planners, the article examines siting criteria and major impacts of wind turbines in the context of local planning and zoning. Unlike natural gas or coal-burning facilities, where regulation occurs at the state level, wind power facility regulation happens locally, and most states do not require permits. Any impacts that would need mitigation are generally confined to a local area because wind turbines generally have no impact beyond their circumference of visibility. However, state permits may be required when facilities impact wetlands, sand dunes, or other sensitive environments. As with all projects, review zoning ordinance and the master plan to ensure compatibility.
	Further Reading	"Wind Turbine Siting," Minnesota Environmental Quality Board," http://www.eqb.state.mn.us/EnergyFacilities/wind.html "MN Model Wind Energy Conversion Ordinance – 2005," Minnesota Association of County Planning and Zoning Administrators, et al., http://www.mncounties3.org/macpza/Dist%20D%20modelwindordinancefinal.pdf "Wind Turbines and Birds: Putting the Situation in Perspective in Wisconsin," Wisconsin Focus on Energy, http://www.focusonenergy.com

Case Studies

<table>
<tr><td>What Is It?</td><td colspan="2">Description of successful wind project case studies</td></tr>
<tr><td>Why Should I Care?</td><td colspan="2">This section provides an analysis of past wind energy projects to illuminate what worked or did not work and why.</td></tr>
<tr><td>Snapshot</td><td colspan="2">• Listen carefully to community concerns and gather information as needed.
• Educate the public using techniques that meaningfully communicate the results of developing the site.
• Communicate early and often with landowners and other stakeholders.
• Remain open to unorthodox solutions to potential concerns; many can be mitigated with effort and flexibility.
• Many success stories are outlined in the “Wind Power for Rural Economic Development” Wind Powering America presentation.</td></tr>
<tr><td>When Will It Come Up?</td><td colspan="2"><table><tr><th>Potential</th><th>Promotion</th><th>Public Outreach</th><th>Planning</th><th>Permitting</th><th>Project Construction</th><th>Project O&M</th></tr><tr><td></td><td>X</td><td>X</td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td rowspan="2">Resource Lists</td><td>Essential</td><td>“Wind Power Facility Siting Case Studies: Community Response,” National Wind Coordinating Committee, http://nationalwind.org/publications/siting/Wind_Power_Facility_Siting_Case_Studies.pdf. The NWCC Siting Workgroup studied communities’ reactions to local wind development projects, with the intent of identifying circumstances that distinguish welcomed projects from projects that were not accepted by the communities. The NWCC Siting Workgroup was also interested in examining the changes in community perceptions before, during, and after project construction, as well as recognizing what wind project developers can do to address the concerns that often recur at wind project sites. Case studies are presented from southwestern Minnesota, central New York, and south-central/western Oklahoma. The interviews and background research identified many keys to molding a successful partnership among wind developers, local communities, governments, and other concerned parties. The following approaches were used by developers to successfully deal with community concerns: listen carefully to community concerns, educate the public, communicate early and often, and remain open to unorthodox solutions.

“Community Owned Wind Projects: Case Studies,” Windustry, http://www.windustry.org/community/projects.htm. Community ownership of wind projects has proven to be a powerful driver for rural economic development. When local groups own wind projects, energy dollars stay local and jobs are created. This page contains information of many successful projects and information about different and creative ways to structure them to maximize local benefit from clean renewable energy.</td></tr>
<tr><td>Further Reading</td><td>“Wind Power for Rural Economic Development,” Wind Powering America, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/flowers_mt_2005.pdf

“What Is Community Wind Energy?”, Windustry, http://www.windustry.com/community/default.htm</td></tr>
</table>

Further Information

What Is It?	Additional information on topics not included in this guidebook
Why Should I Care?	If you have the time, you can learn more about wind energy projects.
When Will It Come Up?	

Potential	*Promotion*	*Public Outreach*	*Planning*	*Permitting*	*Project Construction*	*Project O&M*
	X	**X**				

Further Reading

Windustry Web site. Extensive information from the very basic to the very complex, www.windustry.org

"Windustry's Wind Farmers Network." An online forum for wind energy development discussions where experts discuss many aspects of wind energy development, www.windfarmersnetwork.org

"Federal Energy Subsidies: Not All Technologies are Created Equal," Renewable Energy Policy Project, http://www.repp.org/repp_pubs/pdf/subsidies.pdf

"American Planning Association Policy Guide on Energy," American Planning Association, http://www.planning.org/policyguides/pdf/Energy.pdf

"Bring Wind Energy up to Code," American Wind Energy Association, http://www.awea.org/pubs/documents/Perspective2.pdf

Wind Powering America State Wind Working Group Summit, http://www.eere.energy.gov/windandhydro/windpoweringamerica/wkshp_2006_state_summit.asp

"Balancing Cost & Risk: The Treatment of Wind Power in Western Utility Resource Plans," Lawrence Berkeley National Laboratory, http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/workshops/2006_summit/wiser.pdf

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One of the key stakeholders associated with economic development are local government officials, who are often required to evaluate and vote on commercial wind energy project permits, as well as to determine and articulate what wind energy benefits accrue to their counties. Often these local officials lack experience with large-scale wind energy and need to make important decisions concerning what may be a complicated and controversial issue. These decisions can be confounded with diverse perspectives from various stakeholders. This project is designed to provide county commissioners, planners, and other local county government officials with a practical overview of information required to successfully implement commercial wind energy projects in their county. The guidebook provides readers with information on the following 13 topics: Brief Wind Energy Overview; Environmental Benefits; Wind Energy Myths and Facts; Economic Development Benefits; Wind Economics; The Development Process; Public Outreach; Siting Issues; Property Tax Incentives; Power System Impacts; Permitting, Zoning, and Siting Processes; Case Studies; and Further Information. For each of the above topics, the guidebook provides an introduction that identifies the topic, why local government should care, a topic snapshot, how the topic will arise, and a list of resources that define and assess the topic.

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