CENTER *for* RURAL AFFAIRS

RESPECT AND RESTORE: REASSESSING LOCAL WIND ENERGY STANDARDS

LUCAS NELSEN

MAY 2016

INTRODUCTION

Wind energy continues to be a growing industry in the United States, with several states tapping this renewable resource for over 20 percent of their power needs. In 2015, wind produced more than 190 million megawatt-hours, enough to supply 4.7 percent of energy in the U.S., with 13 additional gigawatts of wind energy capacity under construction and set to come online in 2016. As states and businesses are seeking out renewable energy to provide power to consumers and facilities, the release of the Clean Power Plan has created goals for states to reduce emissions, in large part by increasing investment in renewable energy and retiring older coal-fired resources.[1, 2]

With all of these factors in place, this industry continues to grow, especially in the Midwest and Great Plains. The development of wind has not only brought clean and renewable power to consumers in these states, but has also delivered jobs, tax revenue, and annual payments to landowners. As this growth continues, projects are breaking new ground in areas, and developers are interacting with more communities and landowners in the process. While landowners received at least $180 million in land lease payments (and that number could continue to grow to $1 billion annually by 2050), many still face challenges from the development of projects on their land.[3]

The expansion of wind energy has caused several counties and municipalities to reassess standards for the siting of projects, or for the first time, examine the issue and form zoning and siting requirements. Landowners, too, are likely encountering these projects for the first time, learning about the siting and construction process while also considering what signing an agreement might mean for their land. If the wind industry is to continue its growth, this reality must be addressed, along with other challenges for developers, communities and landowners.

This report seeks to address these challenges. We will provide a brief description of the typical elements that comprise the construction process, and lay out potential problems that landowners and communities may face stemming from the construction process. We then

1. AWEA. (2016, February 29). U.S. number one in the world in wind energy production. Retrieved from AWEA: http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8463

2. Mooney, C. (2015, August 10). The U.S. wind energy boom couldn't be coming at a better time. Retrieved from The Washington Post: https://www.washingtonpost.com/news/energy-environment/wp/2015/08/10/the-boom-in-wind-energy-couldnt-be-coming-at-a-better-time/

3. Department of Energy. (2015). Wind Vision: A New Era for Wind Power in the United States. Washington, D.C.: U.S. Department of Energy.

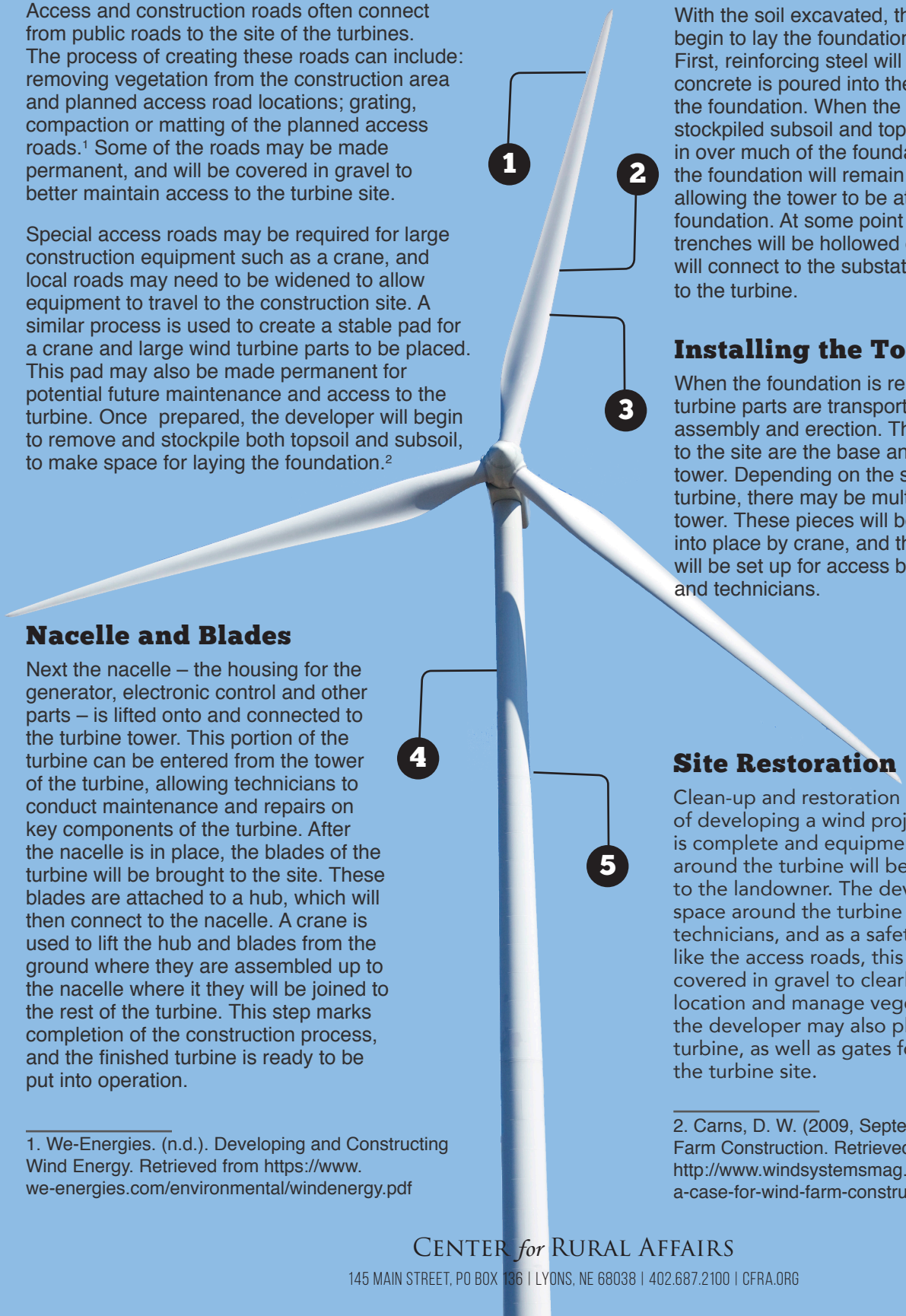
Construction Process

The construction process for a commercial wind energy system can vary depending on the developer, the equipment, and the chosen site for a project. The process for identifying and selecting the best techniques require surveying and design work on behalf of the developers. Although there is some variance, there are key parts of project construction that will likely be part of most projects.

Preparing the site

Access and construction roads often connect from public roads to the site of the turbines. The process of creating these roads can include: removing vegetation from the construction area and planned access road locations; grating, compaction or matting of the planned access roads.[1] Some of the roads may be made permanent, and will be covered in gravel to better maintain access to the turbine site.

Special access roads may be required for large construction equipment such as a crane, and local roads may need to be widened to allow equipment to travel to the construction site. A similar process is used to create a stable pad for a crane and large wind turbine parts to be placed. This pad may also be made permanent for potential future maintenance and access to the turbine. Once prepared, the developer will begin to remove and stockpile both topsoil and subsoil, to make space for laying the foundation.[2]



Foundation and Interconnection

With the soil excavated, the developer will begin to lay the foundation for the turbine. First, reinforcing steel will be put in place before concrete is poured into the space cleared for the foundation. When the concrete is dry, the stockpiled subsoil and topsoil will be filled back in over much of the foundation. The center of the foundation will remain above the topsoil, allowing the tower to be attached to the concrete foundation. At some point during site preparation, trenches will be hollowed out to lay cables that will connect to the substation or collector system to the turbine.

Installing the Tower

When the foundation is ready, the tower and turbine parts are transported to the site for assembly and erection. The first portions brought to the site are the base and other sections of tower. Depending on the size and model of the turbine, there may be multiple pieces to the tower. These pieces will be assembled and set into place by crane, and the inside of the tower will be set up for access by construction crews and technicians.

Nacelle and Blades

Next the nacelle – the housing for the generator, electronic control and other parts – is lifted onto and connected to the turbine tower. This portion of the turbine can be entered from the tower of the turbine, allowing technicians to conduct maintenance and repairs on key components of the turbine. After the nacelle is in place, the blades of the turbine will be brought to the site. These blades are attached to a hub, which will then connect to the nacelle. A crane is used to lift the hub and blades from the ground where they are assembled up to the nacelle where it they will be joined to the rest of the turbine. This step marks completion of the construction process, and the finished turbine is ready to be put into operation.

Site Restoration

Clean-up and restoration of the site is key part of developing a wind project. After construction is complete and equipment is removed, the area around the turbine will be restored and returned to the landowner. The developer will retain space around the turbine to ensure access for technicians, and as a safety precaution. Much like the access roads, this area will often be covered in gravel to clearly differentiate the location and manage vegetation. In some cases, the developer may also place fencing around the turbine, as well as gates for added security at the turbine site.

1. We-Energies. (n.d.). Developing and Constructing Wind Energy. Retrieved from https://www.we-energies.com/environmental/windenergy.pdf

2. Carns, D. W. (2009, September). A Case for Wind Farm Construction. Retrieved from Wind Systems: http://www.windsystemsmag.com/article/detail/33/a-case-for-wind-farm-construction

CENTER *for* RURAL AFFAIRS
145 MAIN STREET, PO BOX 136 | LYONS, NE 68038 | 402.687.2100 | CFRA.ORG

review county regulations regarding commercial wind energy systems, focusing on the issues addressed and requirements that may be missing. Finally, we provide recommendations for addressing challenges and identifying best practices for future development of wind energy systems.

LANDOWNER AND COMMUNITY CONCERNS

In order for project developers and crews to access the selected locations for individual turbines, they must clear paths for and construct access roads. These access roads and paths are an essential part of the construction process, providing construction crews and later wind energy turbine technicians a reliable way to access sites without disturbing land that may currently be used by the landowner for farming, grazing, or other purposes. Ensuring that these access paths are sufficient for construction and maintenance purposes is essential to transitioning the land back to owners for their own use.

RESTORATION

Part of this transition is returning non-permanent access areas like equipment pads back to their previous condition. Creating these access routes often involves the removal of vegetation, compaction of the soil to provide a stable area for heavy equipment, or removal of soil so it can be replaced with material that will provide greater stability.[4] The removal of vegetation and native soil may have long-term implications for landowners, possibly contributing to greater incidence of erosion, providing an opportunity for invasive species to intrude, and possibly removing native habitat for some species.[5]

Compaction may have long-term effects, and is often cited as a concern by landowners on wind and other energy projects. Compaction of the soil, especially on agricultural land, can decrease crop yields and potentially damage drainage tiles. Developers are aware of this concern, but it still remains an issue for many landowners because of the difficulty of mitigating potential damage.[6] Restoration of the area that will not remain as an access road is a key part of returning non-easement land back to the owner, and ensuring that they can make use of it.

PUBLIC ROADS

A common community issue is the potential damage of county roads due to heavy equipment being transported to construction sites. Many of these roads are low or minimum maintenance, and are not intended to handle the weight required to transport turbine parts.[7] Community members are concerned about any damage that might be done to their roads, and who will pay to fix these damages once construction is complete. They typically desire some assurance that counties or townships will not be left covering the full cost of repairs.

OTHER CONCERNS

Other concerns include the visual impact of projects, especially as wind energy expands into undeveloped areas with wide swathes of open space. Local stakeholders often value these open spaces, and may be wary of allowing development of any kind that could encroach upon those scenic views. Additionally, some communities and landowners take issue with the way economic impacts may be dispersed, or how those benefits may disproportionately benefit some community members more than others. Addressing either of these concerns may be difficult, as both are sometimes implicit parts of development.[8]

4. Burger, M., Colella, S., Quinlivan, S., & Rousseau, J. (2007, March 1). Retrieved from Worcester Polytechnic Institute: https://www.wpi.edu/Pubs/E-project/Available/E-project-040307-202930/unrestricted/windMQPc07PART1.pdf

5. Sandhills Task Force. (2016, January 28). A Whitepaper Outlining the Need to Address Energy Development and Other Urgent Conservation Priorities for Nebraska's Sandhills. Retrieved from Sandhills Task Force: http://sandhillstaskforce.org/pdfs/Whitepaper-on-Conservation-of-the-Sandhills-012816.pdf

6. Krizan, R. (2011, December). Construction. Retrieved from Wind Systems: http://www.windsystemsmag.com/article/detail/313/construction

7. Kronick, D. (2010, Fall). Road Damage: The Unintended Consequence of Wind Farm Development. Technology Exchange.

8. Rynne, S., Flowers, L., Lantz, E., & Heller, E. (2011). Planning for Wind Energy. Chicago: American Planning Association.

OVERVIEW OF COUNTY DECOMMISSIONING AND RESTORATION PLANS

County and township ordinances are commonly used to address community concerns relating to the development of wind energy on local roads and land. Using the National Renewable Energy Laboratory overview of wind energy ordinances, we can examine the commonalities and differences among ordinances, and see how some ordinances address challenges while other community and landowner issues are left unaddressed.[9] Some common features of decommissioning and restoration ordinances are requirements for the depth of foundation removal, time-sensitive requirements for decommissioning a turbine or project, the removal of access roads, and replacing soil and vegetation at the site.

Nearly every township and county in the overview had a requirement for the amount a turbine's concrete and steel foundation must be removed upon decommissioning of a project. In some instances this was as low as a depth of three feet in the case of Lehi City, Utah, while Morrison, Wis., requires a minimum of eight feet for the depth of removal. The most common of these requirements was a minimum of four feet, often with the goal of allowing for agriculture operations to use the land again after decommissioning. Removal of the foundation is essential to restoration of a site after a project has been decommissioned, but there are no requirements in place for post-construction restoration practices in the selected ordinances.[10]

Another common requirement is that the project owner comply with decommissioning ordinances within a set time frame. The shortest time frame from the overview was Brown County, Minn., at 90 days to comply with the removal of the turbine foundation from the end of project operation. Longest among the examined ordinances was Brookings County, S.D., which provided the owner with 18 months to not only remove the turbine foundation, but also return the topsoil quality to pre-project condition and removing access roads from the property. Some ordinances gave separate time requirements for these activities, often prioritizing the removal of the turbine's foundation over the restoration of soil quality and vegetation.[11]

Many ordinances required that wind project owners remove project access roads during decommissioning. Several ordinances allowed for property owners to keep these access roads if they chose, while others simply required removal and restoration. Ordinances that require the removal of roads and the restoration of the area help insure that landowners will have full use of their property again, but these ordinances are retroactive in nature and tend to not consider mitigating impacts before and during construction.

Notably, none of the ordinances required bonding with a county or township for damages to public roads due to the transportation of heavy equipment. Some ordinances did require bonding to cover the costs of decommissioning, but these were meant to enforce decommissioning plans, or to cover the cost of decommissioning in case the owner of a project would not comply with the requirements of the ordinance.

Requirements for soil and vegetation restoration were also common, but were also primarily focused on post-decommissioning restoration rather than on post-construction restoration of the site. Many ordinances did not go into great detail in requiring soil and vegetation restoration, calling for the site to be restored to pre-project conditions. Alternatively, some ordinances like that of Shawano County, Wis., set out that the site should be restored to reflect the character and unique features of the area.

While these ordinances provide numerous requirements that address concerns relating to the decommissioning of projects, there are no requirements that speak to issues that relate to the construction of access roads to a turbine site or site restoration post-construction. Additionally, there are no requirements for contributions to maintenance or repairs that could be required due to transportation of parts and machinery for a project. Although some of these may be addressed in individual landown-

9. Oteri, F. (2008). An Overview of Existing Wind Energy Ordinances. Golden: National Renewable Energy Laboratory.

10. Oteri, F. (2008). An Overview of Existing Wind Energy Ordinances. Golden: National Renewable Energy Laboratory.

11. Oteri, F. (2008). An Overview of Existing Wind Energy Ordinances. Golden: National Renewable Energy Laboratory.

er agreements, the lack of codified standards likely allows for some community and landowner issues to go unaddressed. Establishing clear standards and guidelines for projects allows local officials to have more effective oversight, and can make the approval process for new project proposals more efficient.

RECOMMENDATION

Analysis of county and township ordinances regarding the development and operation of wind energy projects reveals several issue areas that are currently unaddressed. This section features recommendations that may assist in mitigating the concerns of communities and landowners alike.

PRE- AND POST-CONSTRUCTION ORDINANCE REQUIREMENTS

Ordinances tend to focus on the decommissioning of wind energy projects, rather than pre- and post-construction requirements for project developers and owners. While this gives local officials oversight on decommissioning, it means that ordinances do not provide developers with clear guidelines or requirements for projects, leaving many practices to individual landowner agreements and limited the oversight of local officials. It is important that local and county officials consider examining the typical construction process and what issues may occur, and create standards that address concerns throughout the entire development of a project.

Addressing the lack of ordinal requirements surrounding construction is an essential step in confronting issues such as post-construction restoration. Expanding these standards to cover elements of the construction process is also the best way to ensure that public roads will be maintained or repaired after construction is complete. Working with developers and stakeholders, local officials should craft ordinances that will create clear guidelines for developers that will alleviate landowner and community concerns.

The list of Best Management Practices (BMPs) formulated by the Bureau of Land Management for development on public lands stands as an example. The list of BMPs is fairly comprehensive, and includes mitigation measures for developers that are built into right-of-way authorizations. These built-in mitigation measures can cover important issues like forming post-construction revegetation plans for disturbed areas, as well as transportation planning to evaluate impacts to local roadways and form agreements for contributing to the maintenance of these public roadways.[12]

LANDOWNER OR COUNTY WIND ASSOCIATIONS

County wind associations have already been used to empower landowners to better advocate for themselves and their community in wind development. These associations are comprised of landowners within a county, and may be formed in response to interest in developing a wind energy project in the area or if landowners wish to develop their own project. When working with developers, these associations provide landowners with greater bargaining power during negotiations, and allows landowners and community members the opportunity to share information among themselves and with project developers. These associations can also provide benefits to developers, as it can make land acquisition easier by negotiating with a single entity rather than individuals.[13]

Associations have had some success at negotiating better payments for landowners, but they may also be used to standardize post-construction restoration measures used by wind project developers. By sharing concerns with developers at community meetings, these associations will be able to work with developers to determine best practices for post-construction restoration, the building of access roads, and avoiding damage to local roads. Although forming an association may be difficult, the basic concept of communities meeting with developers and discussing local concerns with developers will bear more fruit than limited communication between project developers and communities.

12. Bureau of Land Management. (2005). Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States. Washington, D.C.: U.S. Department of the Interior.

13. Pryor, R. (2009, November 16). Wind Energy Education Landowner Panel. Retrieved from University of Nebraska Extension: http://extension.unl.edu/statewide/saline/Wind%20Farm%20Landowner%20Association%20Information.pdf

EARLY OUTREACH

The planning process represents the best opportunity for developers to identify stakeholder concerns and formulate best practices to avoid those issues. Before preparing a site for construction or breaking ground on a project, developers ought to use input from members of the community to determine what concerns may exist, and how they can address them early in the process. Seeking out this input from stakeholders in the local community is just the first part of the puzzle, and is a necessary step in creating priorities for mitigation measures.

Access roads represents a chance for developers to use communication to avoid undue impacts and improve relations with landowners. To limit the potential harmful effects of building new access roads from public roadways to the turbine project site, developers can instead work with landowners to find existing access that they can use in place of new roads.[14] Selecting these pre-disturbed areas to build permanent access would remove at least some of the requirements for the removal of vegetation, and improved permanent access that has already been used by landowners may be more appealing to maintain after a project has been decommissioned. Using stakeholder input to devise creative solution is key to making the development process better, and finding solutions to issues that work for local communities.

While some informal meetings with landowners will give developers an opportunity to customize practices to each landowner's property, a different approach is required for wider community outreach. Holding formal public community meetings where local stakeholders and project developers can begin to form relationships is key to outreach efforts. These relationships will allow all stakeholders – developers, local regulators and officials, landowners and community members – to determine which issue areas are most important to them, and the practices that can best address concerns. Best practices derived from these meetings should then be enshrined in ordinances by local officials, providing a precedent for future wind energy development.

CONCLUSION

Examination of county and township ordinances for wind energy projects shows that several shortfalls still exist in addressing the concerns of local communities. Issues experienced by landowners and communities relate to many requirements that are already in place, which should be seen as an opportunity to use skills and knowledge that project developers already possess to determine the best measures to avoid potential impacts from the construction process.

It is clear that greater focus on the pre- and post-construction processes, better planning, and open communication with community members are key to improving the development of wind energy projects. Local officials must work to provide clear standards throughout the development process, rather than focusing solely on the decommissioning requirements for turbines. Landowners and developers must communicate about issues, and determine how construction and development practices can be tailored to avoid local concerns. Project developers should use this input to guide the planning process, stay clear of potential issues before they can arise, and make an effort to go above and beyond what is required.

As wind development continues to grow, it is essential that developers and local officials work to tackle the concerns and issues experienced by community stakeholders. Continuing to develop renewable resources provides tangible benefits to rural communities across the nation. But to ensure that these benefits are not realized at the expense of landowners and community members, wind energy projects must be developed in a way that addresses the challenges presented by the construction process.

14. Nebraska Wind and Wildlife Working Group. (2015, August). Guidelines for Avoiding, Minimizing, and Mitigating Impacts of Wind Energy on Biodiversity in Nebraska. Retrieved from http://snr.unl.edu/renewableenergy/download/Guidelines%20for%20Avoiding,%20Minimizing,%20and%20Mitigating%20Impacts%20of%20Wind%20Energy%20on%20Biodiversity%20in%20Nebraska_August%202015.pdf